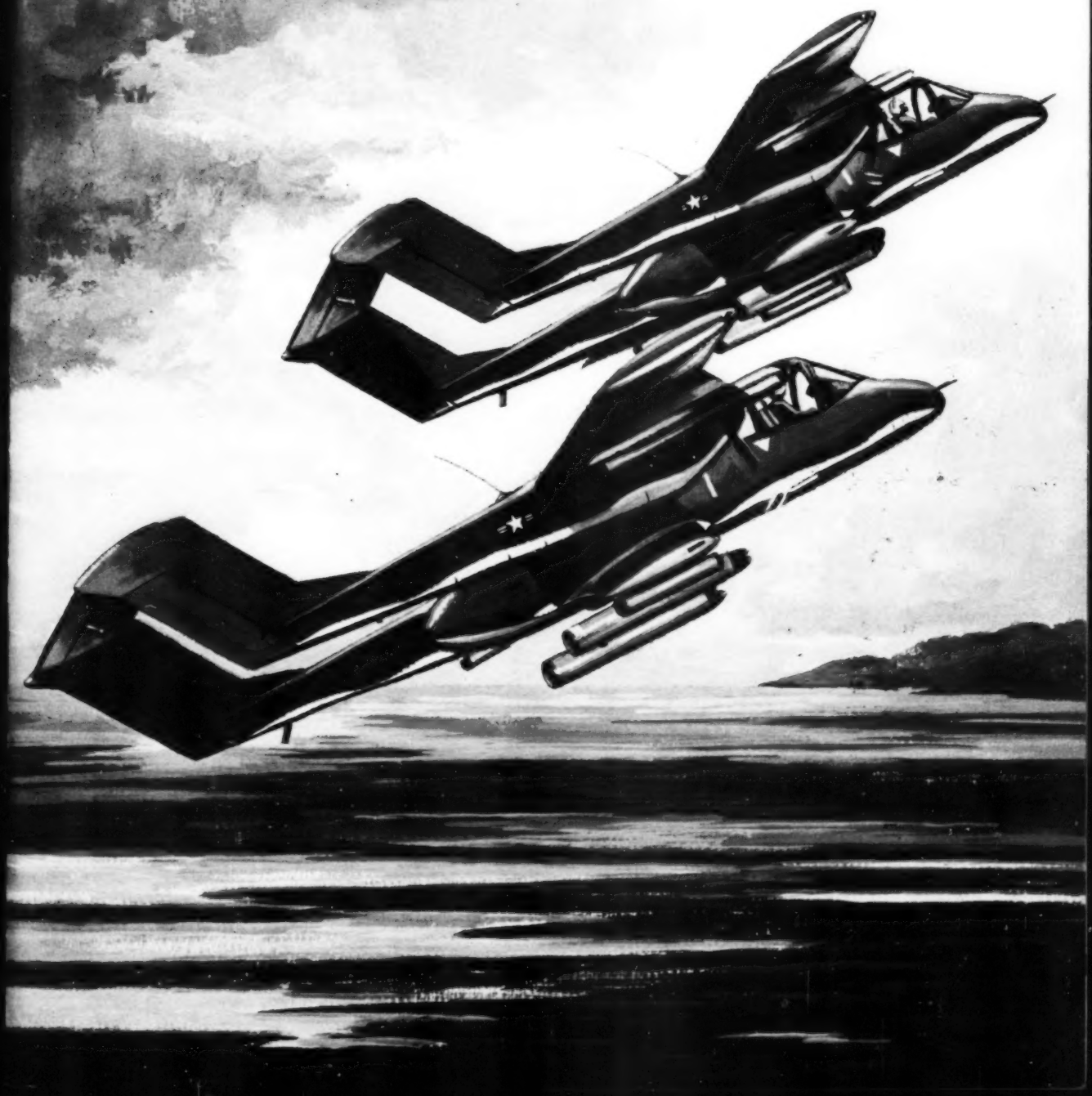
A Naval Safety Center Publication

approach

MAY 1972 THE NAVAL AVIATION SAFETY REVIEW



FORMATION MID AIR COLLISIONS.

Breathes there a naval aviator with soul so dead that he has not to others said, "Gee, that's a good-looking formation!"

PROBABLY not. Formation flight is surely one of the most pleasurable ways for a naval aviator to demonstrate his flying skills to his shipmates and/or the public. But more than that, formation flight is a logical and efficient way to move tactical aircraft engaged in a common purpose. Even more to the point, formation flight is the basic offensive/defensive setup for most air-to-air and air-to-ground tactical operations. It is not surprising, therefore, that a great deal of formation flying takes place every day.

Enthralling as it may be, formation flight has its risks. It stands to reason that aircraft flying in close formation through maneuvering flight have more of a chance to collide with each other than do aircraft going their separate ways.

The truth of this statement is borne out by statistics for FY-69 through 71. During this 3-year period there were 40 midair collisions (involving 80 aircraft) between aircraft engaged in formation flight (see Chart 1). This figure does not include midair collisions which took place during ACM or gunnery and bombing patterns, except where a definite formation evolution was underway, e.g., a rendezvous.

Formation Collision Causes

Formation midair collisions almost invariably involve pilot factor. Specific circumstances vary but most of the accidents in FY 69-71 can be charged to one of the following cause factors:

(1) Wingmen deliberately flew a "too close" wing position.

(2) Pilots lost sight of other aircraft or misjudged relative motion during rendezvous and failed to execute proper overrun procedures.

(3) Misunderstanding during lead change.

(4) Distraction or fixation in formation.

(5) Performance of an unauthorized maneuver.

A few specific examples of how these cause factors figured in formation midair collisions follow.

Continued

Aircraft Damage and Personnel Injuries as a Result of Formation Midair Collisions for the period FY 69-71

Aircraft	Aircraft Damage			Personnel Injury		
	Destroyed	Substantial	Minor	Limited	Fatal	Major	Minor
A-4	5	2		6			2
TA-4F	2						2
A-6	2	1	1		3		1
A-7	3	3	1	2	3		4
EKA-3B, KA-3B	1	1			1		
F-4	3	6	1	13			
RF-4B	1		1				2
F-8		1		5			
TAF-8J	2						
T-2	1		2	6			
T-2B				2			
OV-10A	2					1	

Chart 1

2

Deliberately Flying Too Close

At the conclusion of practice bombing runs, a flight of two A-7Es joined up in loose cruise formation for return to base. After the flight had departed the target area, the wingman joined up on the port side in tight parade formation with about 2 feet of wing overlap.

The flight remained in tight parade formation for about 30 nm whereupon the flight leader gave a speed brake signal which was acknowledged by the wingman. As the leader's speed brakes extended, the wingman's aircraft yawed right, into the lead. A slight correction was applied to gain separation but a closure rate was established. The wingman immediately applied full left rudder, forward stick, and left aileron.

As the wingman's right wingtip came up, contact was made with the leader's belly pan and tailhook assembly causing minor damage. Both aircraft were subsequently recovered at home field. Neither pilot was injured.

Lost Sight of Other Aircraft During Rendezvous

A flight of four *Skyhawks* (replacement pilots), chased by an instructor pilot in a fifth A-4, launched on a day close air support mission. Enroute to the target, prebriefed photo work was done by the formation leader and the chase pilot while the other aircraft followed in a loose cruise formation.

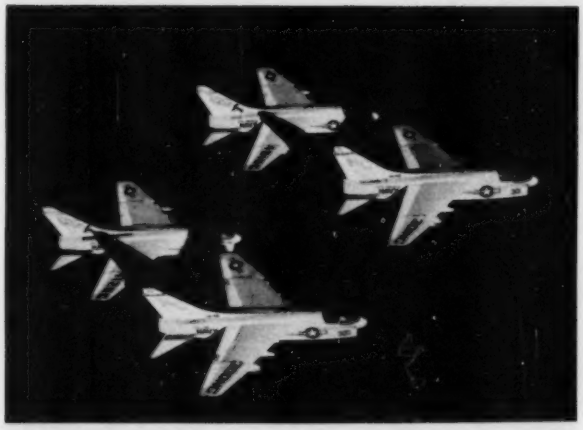
Upon completion of the photo work, the lead pilot commenced a gentle port turn and called for the other aircraft to close up. During the joinup, No. 3 aircraft lost sight of No. 2 but continued the rendezvous, colliding with the port wing and fuselage of No. 2.

Following the collision, both aircraft burst into flames and became uncontrollable. The pilots ejected successfully and were rescued with only minor injuries.

Misunderstanding During Lead Change

During a hung ordnance check, *Phantom* No. 1 dropped back to check *Phantom* No. 2, while both aircraft were in a port turn. Following the check, No. 1 advised No. 2 that he was moving up on the starboard side to resume the lead. F-4 No. 2 failed to hear the word "starboard" and continued to look to his left. He did not acknowledge No. 1's call because he did not have him in sight.

No. 1 *Phantom* rolled wings level as he passed No. 2 on the right side. Simultaneously, No. 2, unable to find No. 1 on the port side, rolled wings level. The two aircraft collided with No. 1's port stabilator contacting No. 2 just aft of the ram air intake.



Jet exhaust from No. 1 induced an immediate flameout of No. 2's starboard engine. A relight was obtained, however, and both aircraft were subsequently landed with only minor damage.

Distracted

During an Alfa strike exercise, an observer in an A-7E was tanking from an EKA-3B. The *Corsair II* was at 3500 feet while the Alfa strike aircraft were high and to starboard.

Upon completion of tanking, the A-7 moved out about 300 feet to starboard to observe the strike group. A pilot in the strike group observed the A-7 moving slowly left as if to rendezvous with the tanker. A subsequent midair collision ensued with the left wing of the *Corsair II* striking the right wing of the *Skywarrior*.

The collision resulted in the loss of 5.5 feet of the A-3's right wing and the A-7's entire left wing. The A-3 remained controllable and was safely landed. The A-7 pilot ejected. There were no personnel injuries in either aircraft.

Unauthorized Maneuvers

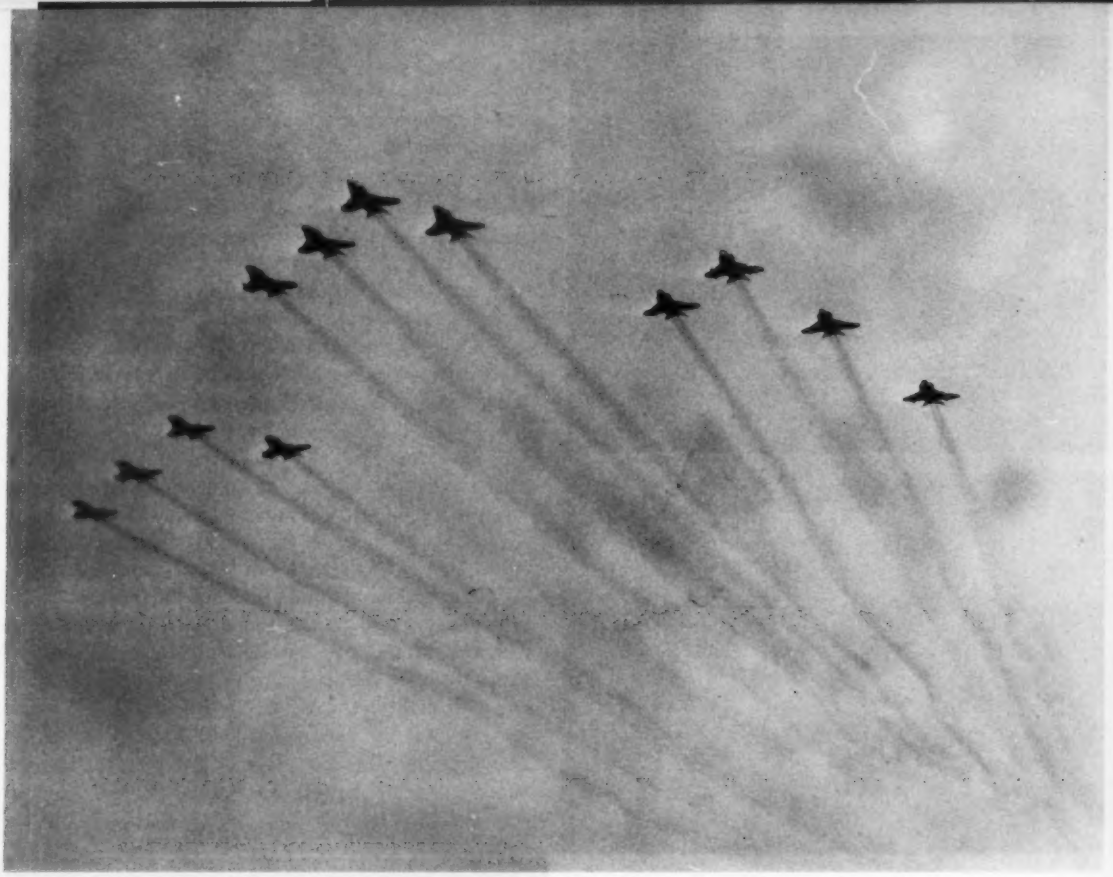
In addition to a substantial number of midairs attributed to wingmen deliberately flying ultra-tight positions, there were a number of midairs due to other unauthorized maneuvers. These included:

• A flight instructor and two students, each flying a TA-4F, were engaged in a rendezvous. The instructor was leading and was in a starboard turn. One student had completed the rendezvous and the other student was in the process when he noted an excessive closure rate. *He pulled up and performed an aileron roll to the right, believing this would slow his closure rate.* A midair collision between the two students' *Skyhawks* resulted. Both ejected and were recovered uninjured.

• Three *Intruder* aircraft departed on individual IFR clearances for practice system bombing. All aircraft canceled upon completion of bombing and commenced radar navigation singly as previously briefed.

The BN in one of the aircraft observed another *Intruder* in tight parade. The flight continued in this formation for about 2 minutes when the *Intruder* on the wing was observed to gain about 30 feet of altitude and start a port turn. After the aircraft reached 45 degrees of bank, the nose dropped slightly and the angle-of-bank increased to 80 degrees. The BN yelled, "Dive!" It was too late and the aircraft collided. Both pilots ejected unsuccessfully. One BN made it and was rescued with minor injuries. The other BN remained with the aircraft and was fatally injured.

• Two *Corsair IIs* completed a bombing and strafing mission and were enroute back to the carrier when they spotted a surface ship. The leader led the flight through a low pass abeam the ship at 100-200 feet, 550 KIAS. Passing the ship the leader initiated a 30-degree pullup and executed a rapid aileron roll. The wingman, unable to follow, collided with the leader. Both pilots ejected,



but the flight leader was lost at sea. The wingman was rescued by the ship on which the run had been made.

Preventing Midairs

Formation flight is more hazardous than routine single aircraft flight. However, the hazard can be minimized by complying with existing regulations on the subject.

These include:

(1) Not engaging in formation flight in aircraft of a type for which no valid requirement exists.

(2) Not engaging in formation flight without prearrangement (preflight brief) except in emergencies (NORDO, visual damage checks, etc.).

(3) Knowing and observing separation standards for type aircraft flown.

(4) Refraining from surprise or non-standard maneuvers, both as a leader and a wingman. Be considerate.

(5) Maintaining proficiency. Practice formation flying "by the book" whenever the opportunity presents itself. If proficiency is lacking after a layoff, the flight leader might consider a series of basic turns, breakups and rendezvous. Don't overextend yourself (or your wingmen) by performing maneuvers which exceed capability, e.g., a night section instrument approach.

Finally, recognize that formation flying is a demanding, full-time job. Guard against distractions or fixations, particularly at night or during IFR. ◄

Formula for Handling People

Listen to the other person's story. Listen to the other person's full story. Listen to the other person's full story first.

Gen. George C. Marshall

'I Seemed To Be The Only One Concerned'

MY squadron was recently undergoing requalification in the C-1A aircraft. This was being done with the assistance of another squadron currently flying the C-1A for COD missions. We had flown to NAF about 40 minutes away for FMLP (Field Mirror Landing Practice) with three aircraft and a number of extra pilots for switch on deck.

Some of the pilots from the supporting squadron were night qualifying so it was quite dark when we finished and loaded up for the return trip to NAS Homebase. As one of six passengers in one aircraft, I settled back to relax for the trip home.

After level-off, I noticed that the pilot was making a number of relatively small power changes. I opened my eyes and looked out. *Lo and behold, we were flying close formation on one of the other C-1As!* I unstrapped and walked up to the cockpit to inquire as to the necessity for *night* formation flying with passengers aboard.

Continued

I was told by the copilot that it was not unusual for their squadron to do this. I told him that I thought it was an unnecessary risk and requested that he move it out to a more comfortable and safer interval. This was *not* done and we proceeded all the way to NAS Homebase in close formation.

Upon landing, I protested again to the pilots and also to the OIC of their detachment. I also discussed it with some of the other members of my squadron who were on the flight. *I was the only one who seemed concerned.*

I have 18 years of flying experience and about 5000 hours, mostly in S-2/C-1 aircraft and have done my share of day and night formation flying. Nonetheless, I fail to see the need for transport type aircraft with passengers aboard to fly formation in the daytime and *even less need at night,* except possibly in emergency situations such as lost comm or no navaids. I regard it as an unnecessary and unjustifiable risk, day or night. I'd appreciate a comment from Headmouse. Maybe I am just an:

Old-But-Not-So Boldmouse

P.S. As an afterthought, the question also comes up concerning the formation experience, day or night, of the average VR squadron LT/LTJG.

We can tell you at the beginning that, on the basis of the facts which you present, our sympathies are with you. Developing proof of any prohibition of the formation flying you describe will be more difficult, but let's see what the books say.

General NATOPS (OPNAVINST 3710.7F) has this to say, in part, on the matter of formation flying:

"a. **General.** *Formation flying is authorized only for those units and types of aircraft for which a valid requirement exists. Appropriate commanders shall ensure issuance of, and adherence to, specific instructions and standard operating procedures for all aspects of formation flying."*

This, of course, does not rule out formation flying in the C-1A. For more answers, we then consulted the C-1A NATOPS. The formation procedures set out on pages 4-10 through 4-14 were enlightening. Briefly, these procedures contained the following pertinent information:

(1) "Normally, the COD mission does not require formation flight. In formation flight the limited visibility aft from the cockpit must be kept in mind constantly. Formation flight should normally be flown in daylight."

(2) "Aircraft proceeding together at night, or when checking out electronics equipment, should fly a comfortable tail chase."

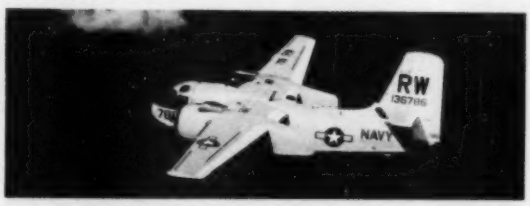
These quotes do not rule out formation flight in the C-1A. In fact, much of the four pages of text in the C-1A NATOPS manual clearly indicates that formation flying is contemplated in the C-1A in appropriate circumstances. However, the above quotes do make clear that **close** *formation at night is out. Furthermore, the quotes indicate that formation flying is not a normal procedure for the COD mission in which the squadron you mentioned is engaged.*

True, the squadron was not engaged in a COD mission during the course of FMLP. However, considering that passengers were being carried and that emergency egress from the C-1A is time-consuming, we believe that formation flying (particularly close formation) was out of order in the stated case. In addition, there is the matter of parachutes. You did not state whether parachutes were available for the passengers. As far as we can determine, most C-1A aircraft do not carry parachutes for passengers. If this was the case on your flight then, obviously, it would be another good reason to avoid close formation.

To go a step further, formation flight is not a matter which should be taken lightly in any aircraft because it does entail risks over and above that normally experienced in flight (see preceding article).

As a result of the letter from **Old-But-Not-So Boldmouse**, *this matter has been referred to the C-1A Model Manager (Commanding Officer, VRC-40) for further study.*

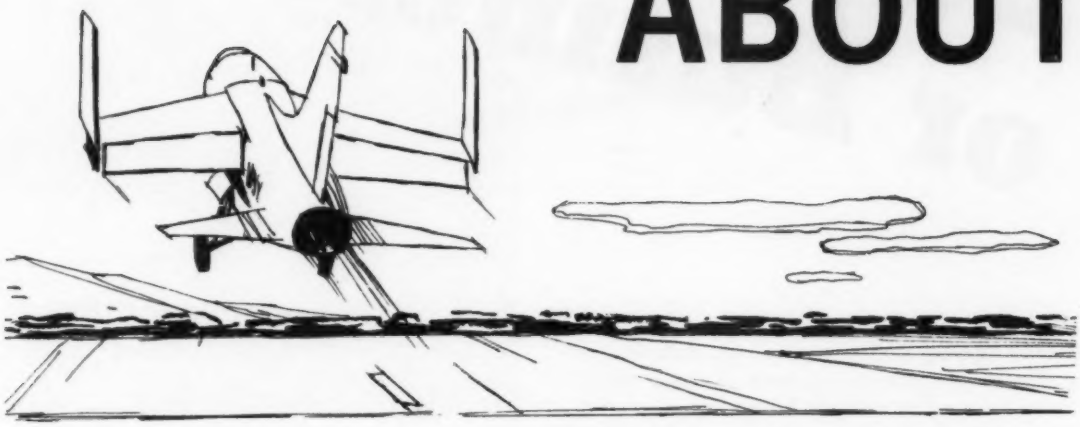
Finally, in any formation flight, only those maneuvers which are justified by the training, experience and proficiency of the pilots involved should be undertaken. ◄



Self-made men usually have a lot of working parts.

Ace L.

SOMETHING TO THINK ABOUT



AN A-7 pilot takes the runway and commences his takeoff roll. Just as the aircraft lifts off, it yaws wildly to the left. The pilot successfully ejects. The aircraft continues to gyrate through the air until it reaches 600 to 800 feet of altitude, then spins into the ground. *Post-accident investigation determined that the pilot took off with his wings folded.*

A T-33B turns final. It is wide and long in the groove but everything seems to be going normally, Suddenly, it pitches nose up. As the attitude reaches the vertical, the aircraft rotates about its longitudinal axis as the nose falls through, then spins into the ground. Both pilots are fatally injured. Subsequent investigation revealed the most probable cause of the accident to have been the result of a nose section door coming fully open in flight.

Two A-4s make a section takeoff and proceed on course in formation. Shortly afterwards, the wingman's aircraft explodes, blowing off the tail section. Reacting instantaneously, the pilot ejects! Tragically, however, he is *not properly* strapped to his chute. He suffers fatal injuries. *Post-accident investigation revealed the most probable cause of the accident to have been a fire/explosion caused by the siphoning of fuel from the tank behind the cockpit.* This was possible since the cap was not properly secured following aircraft refueling.

A Common Thread

The circumstances of these accidents varied, but there is a common thread in the cause factors of all. In every case, the pilots failed to make a thorough preflight of the aircraft and/or complete the appropriate checklists. Had they done so, it is most probable that the discrepancies would have been discovered *before* flight and the tragic accidents thereby prevented.

We could elaborate on the advantages of making prescribed checks, but we would not provide any better reasons than those already enumerated. Checklists really are important. *Very important.* Use them without fail. The life you save may be your own. *(To coin a phrase.)*

The Cross-Country Flight

Boondoggle or Business?

THE CROSS-COUNTRY flight, as we know it in the helicopter training environment, can be executed such that it meets a myriad of objectives. To begin with, it normally lends respectability to individual flying activity statistics and enhances the pursuit of a particular flight hour target. It can provide legitimate relief from dreaded yardwork or perhaps from the obligation to take mother-in-law to Disneyland. It can become a sterling geography lesson for a student who is new to the Southwest and at the same time put many X's on the syllabus completion board. For one so inclined, it might provide new and challenging social arenas in which to perform. Only the imagination limits the list of goodies that can be derived from cross-country flights.

While all of the above might be accomplished on a particular flight, we have not yet mentioned the real rationale behind a command's program for cross-country training flight. Again, any definitive list would be indefinitely long; however, let us discuss a few of the objectives and reflect so as to see if we are undertaking business or boondoggles!

Thorough and detailed planning is certainly required for a cross-country flight. On local flights, ample time is provided for planning and briefing even though fuel management and weather considerations are generally overseen by the operations department. However, on the cross-country, once the point-of-no-return on the first leg is passed, the crew is on its own. The aircraft commander's command billet is greatly expanded from what it is when still within range of the readyroom-based FM radio. Was the planning adequate? Were alternative courses of action considered? Is the flight being undertaken in a professional manner?

The aircraft commander has little or no supervision in this situation and the pilot-under-instruction in the other seat has no previous similar experience with which to compare this flight. Here, it seems, we approach the fine line between business and boondoggle. Make no mistake, cross-country flights should be fun; however, the tender student is taking it all in and trying to develop his own professional standards. He is determining in his own mind what the objectives of the flight actually are, a professional training flight or a proposed happy hour block time, and how well that objective is being fulfilled. He clearly senses whether the objective is merely to "get there" or rather to make use of every opportunity to teach him professional planning and execution in point-to-point operations in areas outside the local pasture. He knows whether or not the aircraft commander is attempting to convey his thoughts on decision making, safety considerations, enroute procedures, and arrival procedures. If the aircraft commander is just "pressing on," the

pilot-under-instruction, the command, and the taxpayer are being shortchanged.

Once the aircraft is on deck and shut down at the destination, does the training cease? Many complain that aviation assignments deprive young officers of the opportunity to lead on the ground. Here is an opportunity. The command is small, but the principles of leadership are the same and, if effectively employed, they will serve as valuable experience for all concerned. The aircraft commander, as officer in charge of his detachment, has personnel, logistics, and operational matters which need his attention.

True, he still has a higher command to which he is responsible, and perhaps circumstances will dictate that he communicate with homebase for guidance or just keep the command informed. In any case, he has great responsibility for the equipment and personnel. How he fulfills these are of great interest to the pilot-under-instruction and an invaluable practical lesson in small unit leadership. If these thoughts and experiences are kept from the newly designated aviator he will be deprived of much valuable training.

Only planning and leadership have been touched upon here; however, when one stops to reflect upon the whole cross-country sequence, it is easy to see that there is no limit to what can be encountered on these away-from-home-base flights. Flight clearance procedures, aircraft security, aircraft servicing, crew billeting, transportation, crew coordination, minor maintenance, emergency procedures, and many other facets of military aviation are to be dealt with.

The point that we should keep in mind is that today's pilot-under-instruction is tomorrow's aircraft commander, and not too long after that, somebody's operations officer or unit commander. The lessons he learns and the professional standards he develops while a pilot-under-instruction on cross-country training flights will go a long way toward determining his performance in more responsible billets later on.

All participants, whether we're student, instructor, crew chief, or crew chief-in-training, should reflect on the cross-country flight and the great training opportunity it provides for enhancing our professional skills and capability to conduct safe, efficient operations. If our objective is a boondoggle, fly PSA. If it is business, our *training* business, the professionally planned and executed cross-country training flight will reap great rewards.

3rd MAW Safety Review Nov '71

A LOOK AT HELICOPTER SAFETY

Most mail addressed to the Editor is interesting, especially when the envelope contains a proposed article for APPROACH from someone in the Fleet. We acknowledge with thanks the following article from CDR J. E. Driscoll, CO of HC-7 who, although he didn't write it, edited the content after finding it deep in a bottom drawer.

"THE ALL Navy/Marine major accident rate plunged to a record low of 1.13 major accidents per 10,000 flight hours during FY-71, bringing considerable joy to Navy officials including CNO," states the September 1971 issue of APPROACH. After thumbing through the statistics quoted and reviewing our own accident rate, I noted with satirical satisfaction that we are doing our best to keep pace with the rest of the Navy.

I went even further and reviewed back issues of *Weekly Summary*. I found that fighter, attack, and helicopter classes have the dubious distinction of reigning regally atop the royal mishap heap. Frankly, I find it an undesirable throne to lay claim to. If, as Shakespeare wrote, "Uneasy lies the head that wears the crown" we, the members of the helo community, must sport a most uneasy, collective head.

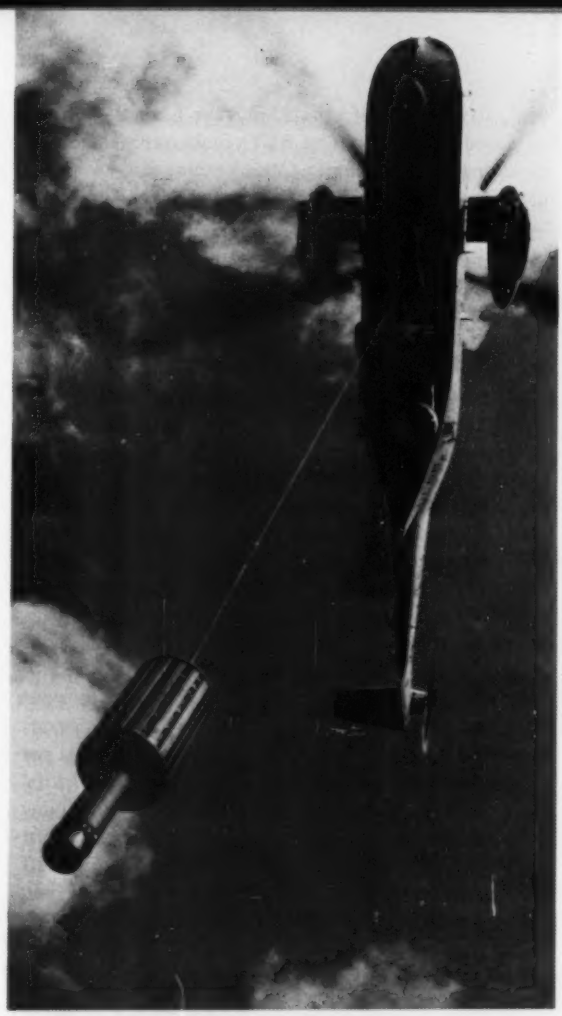
Certainly it would be a pleasure to discover a coup d'etat had occurred and we were abruptly, unceremoniously dethroned. However, this cannot happen until we reevaluate our position and assume a corrective stance – beligerent if need be, for we have been passive too long. In a company of individuals, individualism must be set aside and a unified effort made to combat the incipient laxity creeping into our rotor society.

If we are also to accept as truths the statements in APPROACH hailing us as the best informed, best trained, best qualified, best protected, best equipped, (best everything) aviators ever to be thrust upon the aviation world, then why are we dropping like flies on a winter's day? The answer must lie primarily within ourselves and secondly in our maintenance folks.

There is, of course, the inherent fallibility of the ungainly aircraft we force to flail away through the wild blue. Material failure (airframe and systems) accounted for many of the accidents for calendar years 1970 and 1971, but responsibility for these lost chicks may return to roost on our stooped shoulders. When was the last time you submitted a UR or Anymouse? No one will bring pressure to bear on the appropriate parties unless we complain en masse through channels.

Too often I discovered myself identifying with unsavory descriptions of contributing factors which resulted in aircraft loss or injury. No matter how slight the insinuation, I found it to be disconcerting, slightly embarrassing, and most discomforting. As one of the squadron's newer HACs and having few hours in that capacity I am forced to ask, as you must ask yourself, just how good am I? Can I handle every situation that confronts me?

Knowing I'm one of the best is no consolation in an emergency when ice water surges through my veins, and I mentally scan the dusty pages of my NATOPS trying



vainly to remember if I should pull the T-handle or bring the speed selectors out of FLY. Embarrassment brings about emotional discomfort, but nothing must be more uncomfortable than being laid out, waxen-faced and cold, as former friends file slowly by the bier staring down at me – if there's enough left to stare at. Too late for emergency procedures then.

Do *you* know *your* emergency procedures? I mean know them well enough to simultaneously recite them verbatim, keep track of trump, and converse intelligently with others at the table? That's a piece of cake compared to broadcasting a mayday after remembering to switch the radio to GUARD, the IFF to EMERGENCY, correctly analyze a flight problem, establish a glide toward a suitable landing site among a spider web of powerlines and telephone poles, and determine the direction of the wind. Aye, there's the rub that gives pause. In that single moment you wager all you have, or will ever have – happy hours, the mortgage on the house, next year's vacation, future progeny, *your very existence.*

Emergency procedures must be foremost in your mind and readily recallable – *knowledge of the aircraft cannot take a back seat to anything*. Every flight is not an emergency; so we must occupy ourselves with total knowledge of routine items that may be incidents lying dormant just waiting to spring on us at the most inopportune time. How well you know your aircraft determines whether or not *those incidents and you* become the next statistic in CROSSFEED. You must be

able to recognize when some misguided soul, in an effort to show his total smarts, gives you a snow job that may kill you.

As a novice HAC I am entering the realm of a more ominous opponent – a 3-year lieutenant. Statistics reveal this one to be the staging area for increased mortality among junior birdmen. Having successfully completed 1½ years of rigorous flight training and another 1½ years defying the odds that I would not come down with the aircraft and me intact, I am ready to settle back for some relaxed flying.

Decked out in full aviator regalia I am prepared to make the world sit up and take notice. I am the pilot's pilot in my turtleneck sweater, tailored flight suit unzipped to my navel, bare hands (to get the real feel of the stick), and sleeves rolled up to display a magnificent hairy forearm with bulging veins and genuine chronometer. Far out! I am the epitome of idiocy with my survival gear hanging neatly in my locker to better display my physique and regulation aviator's sunglasses.

It would seem, if through some quirk of fate I miraculously escape the next 2 years unscathed, I have an even chance for increased longevity. If my chances are slim, are yours better?

In this period leading up to the squadron's next major accident and while idly waiting for the disaster to pounce on whomever it chooses, whenever it chooses,

should we not strengthen our fortifications? Shouldn't NATOPS be dusted off and reviewed regularly? Should we not refamiliarize ourselves with our personal survival equipment, reevaluate our standards and goals, and possibly regress as far as to offer a supporting voice to the nemesis of all naval aviators – the aviation safety officer? (The insolent so-and-so who consistently drags the APMs into monotony – spewing hell-fire and damnation – pounding his NATOPS like a southern revivalist pounding his Bible.)

Hopefully, there is a way to divert the impending disaster. We must allot a sizeable percentage of our time to the observance of safety procedures if we are to increase our reliability and purge our profession of the blight that is trying to consume us. We must also dispel any attitude that NATOPS is only for the training command and yearly requalifications.

Instead, NATOPS should be our stocks and bonds in which we invest regularly a portion of our time in order to collect all the dividends at maturity. If we remain as current in NATOPS procedures as we do in the Dow Jones averages, we may never unexpectedly invest everything we have in that hunk of real estate known as "the farm." In doing so, we can decrease the mercurial rise in accidents and realize our ultimate goals of increased longevity, social security, and retiring a wise, OLD pilot.

Selected Major Aircraft Accident Rates
(Per 10,000 Hours)

Part I

	FY-69	FY-70	FY-71	* FY-72
All Navy/Marine	1.41	1.37	1.13	.85
Fighter	3.71	3.28	3.02	1.53
Attack	2.52	2.65	1.91	1.56
Helicopter	1.81	1.81	1.10	1.19

Part II

H-1	3.56	2.49	1.80	1.74
H-2	2.47	1.63	.36	.64
H-3	.71	1.28	1.44	.70
H-34	1.22	2.10	0	1.63
H-46	1.80	1.50	.68	1.34
H-53	1.94	1.24	1.60	1.03
H-57	2.35	0	.50	0

* Estimated (Rates based on estimated Feb hours)

The statistics show the major accident rates for certain classes from FY-69 through 8 months of FY-72. The year by year improvement in Part I is apparent. However, for this fiscal year the gale warning flag is flying for the H-1, H-34 and H-46 community. – Ed.

◉AN ANYMOUSE SPECIAL◉

Wheels, Wheels, Wheels!

THE PILOT of a P-3B initiated a waveoff after catching the red waveoff lights of the Fresnel Lens mirror system out of the corner of his left eye.

Pilot: (Adding power) "Flaps to takeoff and approach . . . wonder why the waveoff?"

Copilot: (Raising the flaps) "Flaps at takeoff and approach . . . don't know."

Pilot: "Gear up." (Glancing down at the gear handle which is obligingly already up) "Oh, you already raised them."

Copilot: "Not me, didn't you?" (Addressing the flight engineer) "Did you raise the gear?"

Engineer: "Huh?"

Copilot: (Repeats himself)

Engineer: "Not me."

Pilot: "Oh, my goodness!" (Not an exact quote.) "No wonder the waveoff. They weren't down."

How can the crew of a multiengine, multipiloted aircraft set themselves up for a wheels-up landing? Human error, caused by whatever factors, must get the blame. Let's regress.

The PPC and his regularly assigned copilot were scheduled for a 4-hour, afternoon proficiency flight. The PPC had over 2200 hours in the P-3 and the copilot was only about a week from making PPC himself. The copilot remembers thinking cockily to himself while walking out to the airplane, "Boy, the two of us on a pilot proficiency, what a piece of cake."

When they got out to the airplane they discovered that their fuel load made them about 4000 pounds over landing weight. Since they wanted primarily to shoot touch-and-go's, they were a bit disappointed, but decided to take off and shoot GCAs to low passes until they were down to landing weight. To expedite burning down, they left the gear down after takeoff and lowered landing flaps.

The aircraft switched from tower to approach control and then was passed to GCA. GCA was admittedly having transmitter problems that day, and sure enough, they sounded muffled on VHF and were breaking up on UHF. Their transmissions were usable but quite frequently had to be repeated to be understood.

The weather was fine, the GCA student controllers were getting good practice, and the pilots had shot one approach each down to a low pass. They were leaving the gear and flaps extended to help burn down. At the completion of the second low pass, the PPC noticed that they were down to landing weight and would be able to land after the next approach. As a result, the gear and flaps were raised as per standard waveoff procedures.

The aircraft came to the heading and altitude specified by GCA and was picked up for the third approach. Shortly afterwards the aircraft was turned to the base leg. In listening to the GCA tape later, someone could be heard telling the controller to turn the aircraft at 9 miles vice 12 miles, since there were two other non-precision approaches taking place at the same time. For some reason, possibly his preoccupation with the early turn, the controller neglected to advise the pilot to perform his landing cockpit check. (Error No. 1.)

As the controller directed the aircraft onto base leg, the PPC (at the controls) called for the landing checklist. The copilot, still trying to decipher GCA's transmissions, began the checklist. When he challenged *landing gear* both he and the pilot were concentrating on what was being said on the radio, and he (copilot) instinctively replied, *"down and locked."* During the previous two approaches, the gear had been down and locked already, so a habit pattern had been developed. The copilot had become used to both challenging and replying. The pilot, also preoccupied with the communications difficulties, did not verify that the gear was down and locked. The flight engineer, concentrating on the "big" ball game tuned in on the ADF, missed his chance to catch the dangerous

oversight. (Errors No. 2, 3, and 4.)

"AB 123, turn right, heading 340, stand by for final controller."

"AB 123, this is GCA student final controller, how do you read?"

"GCA, this is 123, read you loud and clear." (slightly broken)

At this point we come across error No. 5. The final controller did not advise, "AB 123, your gear should be down and locked."

Reflecting on his trip down the glide slope, the PPC recalled that he kept rising above the glide path, his airspeed was high, and he was using only about half the power he had used on the previous approaches. This should have computed to something – like, a lot less drag on the underside of the airplane. (Error No. 6.)

About halfway down the glide slope, with transmissions breaking up badly, the controller cleared the aircraft for a touch-and-go. Luckily, the pilots missed this transmission entirely since the controller's UHF transmitter had quit – another fateful link (No. 7) in this chain of events. Both pilots switched on their VHF mixer, which had been off due to the muffled effect, and picked up the controller again who was transmitting simultaneously on UHF and VHF. Getting down towards short final, the PPC told the copilot to switch to tower and verify that they were cleared for a touch-and-go. This was just as they passed over the seawall with its great big sign reading WHEELS DOWN. (Error No. 8.) As the P-3 passed over the approach lights, the wheels watch realized the gear was not down and grabbed for his flare gun. Unfortunately, it was cold outside, and the windows and door to the wheels watch shack were all closed. (Do you feel error No. 9 coming on?) The shack was rather old and the windows and door were hard to open. As a result, he was unable to fire the traditional red flare before the apparently ill-fated aircraft had passed over. (Starting to look like all of the tumblers on a combination lock lining up, isn't it?)

Over the threshold, the pilot was still not fully convinced that he was cleared to land, and the copilot was still trying to raise the tower to obtain the needed clearance (which had already been given). The wheels watch, still undaunted, turned and hit the waveoff lights switch on the mirror landing system. It was these lights

that the PPC saw but, since the mirror is not usually in the scan of a non-tailhook pilot, would he have seen them if he had heard the original clearance to land and had not been considering a go-around?

This was a cheap but bone-chilling lesson which illustrates that the age-old problem of the gear-up pass is still with us. You're right, *it couldn't happen to me* – but then that's what I always said. Remember, the possibility is always lurking somewhere in the pattern, just waiting for the proper sequence of events to allow it to rear its ugly head.

Wisermouse

P.S. The wheels watch was presented with more than one container of his favorite elixir that day.

The majority of pilots who have made wheels-up landings, and hundreds more who have been saved, are pretty much in agreement that the reason was distraction or a change in their habit patterns. In this close call, both conditions existed. Luckily the pilot, who had **almost** *made up his mind to go around, did so when his peripheral vision caught the flashing waveoff lights.*

A demand and reply checklist, if covered correctly, would have caught the gear oversight immediately. The PPC, who did not answer the copilot's demand, must shoulder the entire responsibility. The copilot, who answered his own challenge without actually touching the gear handle or looking at its position, pulled a real **boo-boo** *too. The flight engineer, who apparently was just along for the ride and listening to a ball game, probably doesn't need to be reminded NOW of his* **no-no**.

A breakdown in crew coordination in a big bird is serious at any time, but in the traffic pattern **it is inexcusable**. *The GCA advisories not broadcast might have caught the oversight if transmitted. Finally, the wheels watch who couldn't get out of the shack in time to fire the flare should have realized that fact within 30 seconds after assuming the watch. However, he recovered beautifully by hitting the waveoff lights and certainly deserved his reward.*

Everyone learns something from the mistakes of others. This is a real testimony for flight crews, GCA crews, tower operators, and wheels watches. YOUR job, **whatever it is**, *is important!*

Anymouse

INCREASE YOUR DESCENT

The purpose of Anymouse (anonymous) Reports is to help prevent or overcome dangerous situations. They are submitted by Naval and Marine Corps aviation personnel who have had hazardous or unsafe aviation experiences. These reports need not be signed. Self-mailing forms for writing Anymouse Reports are available in readyrooms and line shacks. All reports are considered for appropriate action.

REPORT AN INCIDENT, PREVENT AN ACCIDENT

WE launched in our H-3 on a night instrument training flight. Weather was reported as 2500 overcast with 2 to 3 miles visibility. The flight proceeded as planned with no problems until after we contacted approach control for some practice GCAs at the local field.

We were cleared for a TACAN approach with a GCA pickup prior to final leg. The cockpit landing checklist was completed and the gear checked down and locked. We were vectored onto final by the controller and told to begin descent as we were well above glide path. A greater than normal descent was initiated in order to get down where we belonged.

We continued our approach with heading changes being given by the controller and a continuing advisory of being above the glide path. Only once during the approach did the controller give an aircraft-to-touchdown distance check, and this was verified by crosschecking the DME. The first concrete indication of something amiss occurred as we approached minimums without being told by the controller. The field was not in sight so we leveled off and continued our headings as the controller gave them. (He continued to tell us we were above glide path.)

The field was sighted at 1 mile and we began a descent until passing over the threshold. At this point we broke into the controller's

transmissions and asked at what altitude he held us and our position. The reply was 450 feet, still above glide path and on heading – no distance. By this time we were well down the runway on a low pass. When we advised the controller of this we met sudden silence and then were advised that we were not on his scope. Throughout the approach he thought we were another aircraft, *1 mile behind our position* on a TACAN approach. The controller had followed the wrong helicopter on his scope throughout the entire approach.

It is recommended that GCA controllers and pilots should positively ensure radar contact prior to commencing an approach. Pilots should set their RAWS/Rad. Alt. limit at non-precision minimums to give them an audio/visual backup for altitude information. GCA controllers should give more than one distance check from the aircraft to touchdown and the pilots must verify and concur with the aircraft's DME.

Rotormouse

We don't have quite enough information to go on, but there definitely was a goof in the handoff from approach control to GCA. It is difficult to understand how approach control could confuse you with other traffic. They must have identified you either from an IFF squawk or by observing your turns. At any rate, it sounds like the one distance check to touchdown agreed, by circumstance, with what your DME read. In a precision approach pilots must remember, as you pointed out, that distance is to touchdown and that aircraft DME might be to a location a mile or more away from touchdown. A pilot should execute a missed approach if there is any doubt in his mind about the information he's receiving. In your case you were correct to level off as you approached minimums with the field not in sight. (If you had been approaching a strange field, you would have gone immediately to climb power and executed a missed approach, right?)

More Turns

WE were shipboard based in an LPH and learned that briefing time for the morning exercise was changed to 0630 vice 0715. HDC (Helicopter Direction Control) briefed us that the temperature was 81°F. Flight quarters was sounded at 0800 without a temperature update.

I lifted, hovered in ground effect, and started to move off the deck. As soon as I moved out of ground effect, my turns drooped. My copilot saved the day by beeping while I slowly gained flying speed and altitude. We later learned that at takeoff time the temperature was 87°F.

I suggest that Metro update the weather between briefing time and launch and that pilots check the power chart before takeoff.

Slowmouse

One outfit, flying UH-1s, has an SOP that makes a minimum margin of 3 percent mandatory. If he's within the margin, the HAC flies; if he's not, he doesn't. ◄

(Adapted from Aerospace Safety, June 1971)

(The following "think piece," which originally appeared in the Naval Safety Center's Weekly Summary, has been widely reprinted, including appearances in the USAF's *Air Scoop* and Aerospace Safety magazines, and the RAF's *Air Clues*. For those of our readers who failed to see it in the Weekly Summary, here it is in APPROACH. The author, a current NAVSAFECEN aircraft class desk analyst, has written a thought-provoking, perhaps even controversial, article about operational pilot fatigue. He calls the shots as he sees them. – Ed.)

PILOT factor . . . lack of judgment . . . false pride . . . crew rest . . . 8 hours of uninterrupted rest . . . reduced alertness . . . progressive unconscious lowering of performance standards . . . all words and phrases addressing fatigue-associated accidents.

Mountains of material have been written about this subject, much of it by authors who have never experienced or even ventured into the real world of the deployed aviator. To whom do they direct most of their words in the cause of accident prevention? You're right – to the pilot.

As a result, the pilot eventually becomes inured to these constant exhortations on a subject which is not always under his control. Such words fall on deaf ears when the actual situation bears little or no resemblance to the written admonishment.

Contrary to popular opinion, a log-jam of fatigue is not only the responsibility of the individual but the responsibility of the command. It is quite simple to blame the pilot, although the pilot's unfortunate experience may have been a result of what *he* thought was aggressive, unflagging devotion to duty. Therefore, it is an absolute necessity for those in authority to be cognizant of fatigue potential.

Factors influencing pilot fatigue are generally well-known – individual physical fitness, time of day, type of operation, length of flight, landing platform, weather, primary

and collateral duties, conscientiousness in performing primary and collateral duties, model aircraft, stage of training, degree of experience, rest, rest interruptions, rest environment, and watchstanding duties, to name a few. Additionally, poor morale and a resultant lack of motivation create a strain which makes an individual much more susceptible to fatigue.

These multiple factors interact in varying degrees on different individuals. Consequently, the fatigue factor cannot be compared by one in command as to how he might feel. Moreover, the commanding officer may feel impelled to drive his men even harder as the pressures and commitments arise.

Some staff planners and managers, who were once the operators, may lose sight of the requirements and actualities involved in producing the results they expect. A squadron may reach a point where it no longer has sufficient time for flying, duties, and rest. Not only does fatigue ensue, but haste as well. Not only do the pilots show the strain, but so do the men.

The leaders within some of these operating outfits advise their people to catch a nap when the opportunity allows. Studies have shown that physical fatigue may be alleviated by a brief nap, but mental fatigue is not significantly reduced without a relatively prolonged

period of sound sleep. But the pace which ensues under these circumstances dictates elimination of any semblance of proper rest.

It is not an unusual tendency within the military to sustain a high tempo of operations with little forethought for the participating individuals. A blind "can-do" attitude is dangerous, ill-advised, and uncalled for. "Can-do" is an essential element under the right set

of circumstances; however, it should not become the daily standard at the sacrifice of efficiency, safety, and the material condition of equipment.

To maintain such a pace when pilots are flying and working far beyond reasonable standards, and maintenance crews are pushing themselves into a state of exhaustion can, and frequently does, prove expensive. The pilot eventually becomes overextended both physically and mentally. He is subjected to the pressure of accelerated flight ops and a total increase in workload for such reasons as short training cycles, impromptu scheduling, competition, poor availability of aircraft and parts, questionable training for training's sake, shortage of available carrier decks, desire on the part of some individuals to make their mark, and a variety of other valid and invalid circumstances.

As a consequence of "can-do," the deleterious effects of fatigue may be frequently overlooked by planners, managers, commanders, and even the pilot himself. Since fatigue is difficult to recognize, and may be considered no more than a subject for a flight surgeon's training lecture in some commands, the cumulative result in

extreme cases can be outright lethargy in which even the desire for survival is depressed.

Commander, Naval Air Force Pacific Fleet, considers fatigue significant enough to warrant an instruction (3750.2 series) entitled "Fatigue in Aircraft Flight and Support Operations." In part, this instruction states:

> *"Means of Eliminating Fatigue.* A great deal of thought and effort have been directed to the elusive problem of fatigue. Some of the means to combat it are:
>
> - Comfort in personal flight equipment.
> - Effective maintenance to achieve:
>
> (1) Proper internal pressurization.
>
> (2) Minimal inflight failures of equipment.
>
> - Good facilities for:
>
> (1) Flight lunches and properly prepared meals prior to flight.
>
> (2) Air-conditioning in living quarters.
>
> (3) Adequate sleeping accommodations.
>
> (4) Noise control.
>
> - Efficient personal equipment:
>
> (1) Oxygen masks, helmets, visors.
>
> (2) Flight clothing.
>
> (3) Reliability in escape and survival equipment.
>
> (4) Adequately fitted sound attenuators for ground support personnel.
>
> - Command supervision and leadership:
>
> (1) High morale and motivation.
>
> (2) Mission awareness.
>
> (3) Minimum wasted time – i.e., most efficient employment of time.
>
> (4) Provision for and attainment of adequate rest.
>
> (5) Exercise and physical fitness.
>
> (6) Help and support in dealing with problems.
>
> *"Detection of Fatigue.* To detect fatigue in people is not simple, and the solution is not likely to lie in assigning more people to the task of detection. It is a responsibility of department/division heads to monitor the activities of their personnel to ensure that they are not being pushed too far. To push a maintenance man, a catapult console operator, a pilot, a CCA controller, or any technical supervisor to the point where safety principles are violated, is false economy. Limits of endurance may be fully knowledgeable of all elements involved in performing each specific task, and if they correlate this with the duration and tempo of operations, the health of the individual, the amount of rest the individual had prior to the current task, and his motivation. The 'buddy system' can be extremely helpful in detecting fatigue. Personnel working in a group, as a team, usually are aware of individual performance within the team. They may be a source for identifying persons who have reached a point where the risk of injury and/or degraded work performance may constitute a hazard to safety.
>
> *"Action.* All commanders must consider the implications and consequences of fatigue in accelerated and extended operations, and in those operations during which exceptionally exacting demands are made on individuals."

Additionally, long-range planning and anticipation are necessary to avoid periods of accelerated operations and ensure a more even distribution of the workload. This workload must be scrutinized critically for fatigue inducements, and these possibilities must be eliminated or reduced wherever and whenever possible. The breakdown of planning must be resisted. Otherwise, factors begin to interfere with the current operation to the degree that the pressure is on.

There has always been a stigma attached to the slightest lack of a hard-charging, overzealous "can-do" attitude. This stigma will never be eliminated. Therefore, meaningless exhortations requesting that an individual admit fatigue accomplish little. Senior commanders, considering the personnel and material means at their command, must provide limitations for the operating commander during accelerated operational training periods. Under military commitment operations, the chain of command must include fatigue considerations in their planning for mishap prevention.

It is incumbent upon the commanding officer, department and division officers, supervisors, and a man's own friends to recognize fatigue in an individual and report the matter. The fatigued individual should not be queried as to his capability for continued activity, for his answer will generally be of the "can-do" variety. He must be canceled from the flight schedule or told to hit the sack and get some rest.

Positive, realistic action at all levels of planning and supervision is required to minimize hazards and prevent occurrence of fatigue factor accidents. ◄

WHAT CAUSED THAT!

A COAST-to-coast flight in a helicopter, even when the weather is good all the way, takes at least 4 days. With mechanical and weather delays, it could take a couple of weeks.

A ferry crew was enroute from the contractor's plant in New England to the sunny part of southern California with a brand new bird. At an RON stop the crew ran into a delay – not of their own choosing.

After spending the night, the crew awakened refreshed and eager to resume. They still had a few days of flying ahead of them.

A flight plan was filed and a thorough preflight inspection was given the helo. Just before entering the aircraft the pilot noticed that both a.c. and d.c. power plugs from the APU were connected to the aircraft. The pilot conversed with the lineman about the power required to start the helicopter. The lineman seemed inexperienced and a bit unsure. He was advised that only d.c. was necessary. The pilot then entered the chopper and when ready, called for power.

The lineman turned on both a.c. and d.c., *despite* the conversation with the pilot, and No. 1 engine was started without incident. However, as No. 2 was being cranked, smoke began pouring through the floorboards. Almost simultaneously the pilot gave the disconnect signal to the lineman. The APU's a.c. plug seemed to be badly worn which apparently allowed it to be inserted upside down. When inserted upside down, the hot lead is connected directly to the grounding portion of the receptacles and will cause the wires to quickly overheat and burn. The helicopter incurred several associated harness wire burns.

The crew later wrote up an incident report and commented that it appeared to have resulted from lack of training of the lineman and inadequate support equipment.

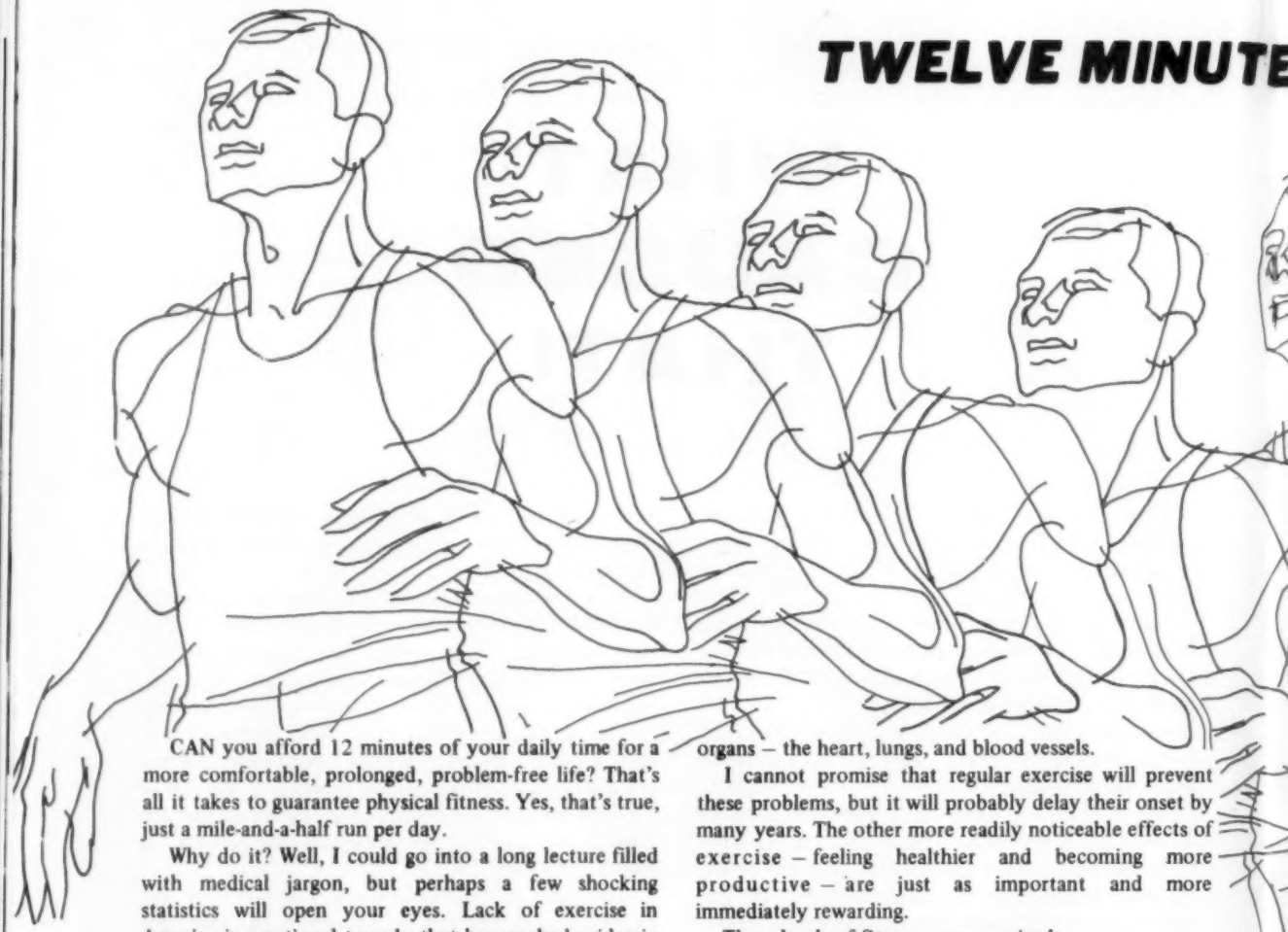
When the report was sent via the NAS, *2 months later,* the CO made some interesting comments. The NC-5 a.c. power cable rubber insulation was slightly worn, but the metal inserts were neither worn nor expanded. Expansion of the inserts would be necessary to plug in the a.c. power cable upside down. Several attempts were made only to prove it was beyond average physical abilities to do so. (The power unit was still in use with the same plugs.) The CO also reported that the lineman was qualified and performed satisfactorily in this capacity daily.

The time delay between the incident and the endorsement of the incident report was excessive. One thing for sure, *something untoward* happened when the helicopter was started, and smoke poured out. There was enough evidence at the time of occurrence to indicate that the NC-5 was suspect. Yet, apparently no one initiated a thorough inspection – *until 60 days later.* Bah!

Anytime there is a mishap, time is of the essence in determining cause. No one investigating mishaps is the least bit interested in just pointing a finger at someone. The purpose of a "look see" is to prevent a similar occurrence. If the mechanical condition of a piece of support equipment is faulty, fix it. If human error is a primary or contributing cause, train the people. If procedures indicate a change is needed, get them changed.

Be curious, be honest, be pragmatic, and above all, *be timely.* ◄

TWELVE MINUTE



CAN you afford 12 minutes of your daily time for a more comfortable, prolonged, problem-free life? That's all it takes to guarantee physical fitness. Yes, that's true, just a mile-and-a-half run per day.

Why do it? Well, I could go into a long lecture filled with medical jargon, but perhaps a few shocking statistics will open your eyes. Lack of exercise in America is a national tragedy that has reached epidemic proportions. With the number of sedentary jobs increasing in America, we are rapidly becoming the most physically inactive people on earth. We drive to the store or post office, we ride a golf cart *for exercise*, and we even ride a power lawn mower! The effects of this inactivity can be seen easily by the incredible fact that every year nearly 1 million Americans die from heart and blood vessel disease – a death rate higher than that of any other country. Heart disease kills one adult every minute of every day in the USA! Studies on hearts of soldiers in RVN have shown that over 75 percent have serious blood vessel damage at 22 years of age. This damage could directly contribute to a heart attack.

Fitness

It is known that an inactive body degenerates into increased body flab, soft and weak muscles, and that all-too-frequently-seen beer belly. However, the most serious health hazard of inactivity and unfitness is not external; it is the damage done to the internal organs – the heart, lungs, and blood vessels.

I cannot promise that regular exercise will prevent these problems, but it will probably delay their onset by many years. The other more readily noticeable effects of exercise – feeling healthier and becoming more productive – are just as important and more immediately rewarding.

Three levels of fitness are recognized:

- *Passive Fitness:* Freedom from disease, or a state of "nothing gone wrong YET." There are no serious problems, possibly won't be for years, but the body is degenerating with inactivity.
- *Muscular Fitness:* Fitness of the skeletal muscles, best seen in the weight lifter who has bulging muscles, but very probably lacks the third level fitness, which is the most important.
- *Overall or Endurance Fitness:* Fitness gained through a regular exercise or aerobics program of the overall body health including the heart, lungs, blood vessels, and other organs, as well as the skeletal muscles.

Aerobics

What type of exercise is best? The only type that will lead to overall or endurance fitness is aerobics. Aerobics is a ***system of exercise designed to improve upon overall health, but particularly the condition of the heart, lungs, and blood vessels.***

UTES OF YOUR LIFE

By Captain Warren F. Ostland, MC,
USAF Hospital, Wiesbaden

Aerobics itself is not an exercise, but there are several enjoyable activities that *are* aerobics in nature, and any or all can be used to achieve overall fitness. These include walking, running, swimming, cycling, handball, basketball, squash, and tennis.

These activities, done as recommended by Dr. Kenneth Cooper in his book *Aerobics*, can guarantee you overall fitness. I urge that you obtain a copy and read it thoroughly; then start the aerobics program that you select from the many available.

Benefits

What are the benefits of overall fitness? Nearly everyone who has become fit through aerobics is an enthusiastic supporter. Benefits gained by most participants are shown by comments such as, "I sleep like a rock," "I feel so much better and don't shout at the kids any more," "I don't fall asleep right after dinner now," "I quit smoking because of jogging," "I don't feel the pressure at work any more." "I've lost weight," and "I can get much more work done now, even desk work."

The physical effects are usually complemented by the psychological benefits of a loss of anxiety and gaining the ability to relax. The difference between a fit and unfit heart can be amazing. By conditioning your heart you can decrease your pulse by over 25,000 beats per day.

Problems

So you can see that I am a firm believer in, and a strong supporter of, aerobics. One caution, however, is to be sure to get medical clearance *before* attempting *any* exercise program, especially if you have had some past medical problem.

The Air Force has adopted aerobics as the official physical fitness program, but it must be carried out properly. In order to be effective, aerobics must be done regularly, preferably daily. I can predict that serious medical complications will be seen in personnel who attempt to run 1½ miles with no preparation. Problems with aerobics are rare if personnel receive adequate training. The whole point of the Air Force aerobics program is to assist its personnel to become physically fit, and the only way this can be done with aerobics is by daily exercise. It has been shown that men who are physically fit are more productive than those who are unfit, and the time used during the day for exercise is, in most cases, recovered by this greater productivity.

(The most difficult part of this program is **getting started.** *Follow the aerobics chart [in the book] that outlines your particular rate of accomplishment. Those few minutes spent each day [5 days a week], are investments in your future without parallel. Try it. – Ed.)*

Blowup

(Dysbarism) illus 26-30

"URP! . . . Scusemeh. Musta been muh lunch."

IF you're on the flight schedule, watch what you eat and drink.

Think back a minute to the balloon – or in some cases, the surgical glove – hanging in the physiology training unit's low pressure chamber. The "higher" up you went in the chamber run, the larger the balloon became. This is a simple demonstration of the expansion of gases at altitude.

When it comes to the human body, the all-encompassing word for the effects of expanding and evolved gas at altitude is "dysbarism." This term covers the physiological effects of reduced barometric pressure independent of hypoxia.

Dysbarism symptoms fall into two general categories: 1) *effects of expansion of trapped gases,* which can result in abdominal pain and aerodontalgia or altitude-induced toothache, and 2) *effects of evolved gases* which result in so-called decompression sickness – the bends, chokes, creeps, and neurological symptoms.

But back for the moment to food.

To turn a phrase, many pilots and aircrewmen eat well but not wisely. Just as the air in the oxygen

chamber balloon expands as altitude increases and barometric pressure decreases, so do the gases in the human body.

The most common symptom caused by this expansion of trapped gas is abdominal pain. Our digestive tracts normally contain varying amounts of gas. The stomach and large intestine contain considerably more than the small intestine.

This gas comes from two processes – 1) the action of digestion and 2) swallowing air – and from the "bubbles" in carbonated beverages. The fact that all of us swallow air may surprise you. We swallow air when we chew gum, drink from a water fountain, gulp our meals, inhale cigarette smoke, pull on a pipe, or drink whipped-up concoctions such as milkshakes. Swallowed air is believed to account for a large proportion of the gas in the stomach and intestines. The medical term for swallowing air, by the way, is "aerophagia."

Effects on Individuals Vary

Individual sensitivity or irritability of the digestive tract varies from time to time, depending on such factors as fatigue, emotional tone, dietary habits, and general physical condition. Certain foods seem to alter the sensitivity of some individuals' intestinal tracts to gaseous distention and cause gastrointestinal symptoms. After a while we get to know which foods "disagree" with us, and we can avoid them.

Expansion of trapped gas in the gut can be anything from a mild twinge to excruciating colic-like pain. At 18,000 feet, trapped gas expands to twice its original volume, and at 33,000 feet, it quadruples. Pain can begin early in the flight and, if not relieved by belching or passing gas, can progress to severe cramps. As altitude increases, relief of symptoms becomes more difficult.

The foods to avoid are those which are 1) gas-forming, 2) contain gastrointestinal irritants, or 3) produce allergic reactions.

In general, high-carbohydrate meals are more likely to increase gas volume than high-protein meals. Gas-forming foods and beverages include *melons, carbonated water, soft-drinks, and beer.* Gastrointestinal irritants include *spicy foods, onions, beans, cabbage, peanuts, peppers, and cucumbers.*

Such "irritant" foods do not necessarily contribute to the gas volume but produce increased abdominal distress through alterations in the sensitivity and motility of the intestinal tract. In addition, any gastrointestinal upset causing diarrhea, nausea, or vomiting can also produce larger quantities of intestinal gas than normal and interfere with normal expulsion. For this reason alone, it's smart to stay on the ground if you have such miseries.

Altitude-Induced Toothache

Reduced barometric pressure can trigger altitude-induced toothache (aerodontalgia) and aching jaws. The cause has never been fully explained. Some years ago it was thought to be simply expansion of gas trapped underneath fillings. More recent thinking is that changes in atmospheric pressure aggravate the impaired circulation in irritated or diseased tooth pulp.

Reduced barometric pressure usually does not affect normal teeth or teeth with open cavities. Ordinarily, a toothache which occurs at altitude would have occurred eventually anyway – the barometric pressure change merely precipitates it.

A less frequent source of toothache during ascent is the presence of an abscess at the root of the tooth. Such an abscess can generate a small amount of trapped gas which causes severe pain on expansion. In other cases, a chronic abscess can cause dull pain on descent which can persist on the ground for several days. However, generally speaking, toothache at altitude occurs during ascent and begins at 5000 feet.

Some people have only one episode of tooth pain in flight with no recurrence. In other cases, the toothache shows a consistent pattern, occurring at a specific altitude during ascent and disappearing at the same altitude during descent. Deep-seated silver fillings without underlying base materials or insulators, mechanically imperfect fillings, and inadequately filled root canals can be troublemakers when barometric pressure is reduced.

Given the Navy's high standards of dentistry and considering the number of hours pilots and aircrewmen fly, toothache at altitude doesn't happen often. If it does, see your flight surgeon or dental officer, and get your troubles checked out before your next flight.

Expansion of Evolved Gas

More commonly associated with the term dysbarism than gas in the gut or toothache are the results of expansion of evolved gases, principally nitrogen. Evolved gas dysbarism manifestations fall into three general categories. These are the so-called *bends* (pains in your joints, muscles and long bones), the *chokes* (an exhausting cough and a burning severe pain in your chest), and the *creeps* (various sensations in your skin). In addition, disorders of the central nervous system result from evolved gas in rare cases.

The incidence of dysbarism increases with the rate of ascent, peak altitude, duration of exposure to altitude, exercise and muscular activity, and cold. Evolved gas dysbarism appears to occur more often in the morning than in the afternoon and evening.

The frequency of evolved gas dysbarism decreases with increasing time of denitrogenation. Ordinarily, the evolved gas symptoms of *severe* dysbarism do not occur below the altitude of 30,000 feet.

Individual susceptibility varies widely from person to person and within a given individual from time to time. Older persons are more susceptible. Obese persons are also more subject to dysbarism because it takes longer for nitrogen to diffuse out of fat than out of muscle. Whether you are fat or lean, susceptibility to dysbarism is extraordinarily increased by exercise while at altitude.

As stated earlier, there are four general categories of evolved gas dysbarism.

Bends – The theoretical cause of the bends is the formation of nitrogen bubbles. The bends are usually relieved by descent.

The knee is the most frequent site, followed by the shoulder, elbow, wrist, hand, and fingers. The pain is unpredictable – it may become worse or better with time and may even suddenly disappear.

The pain is described often as diffuse and poorly localized. It is felt as a boring, gnawing, or aching pain which can progress in intensity until it becomes intolerable and incapacitating.

Chokes – The chokes, which occur later in the course of exposure to altitude than do the bends, are characterized by a burning sensation under the breast bone or sternum, a nonproductive cough, and difficulty in breathing accompanied by a sense of apprehension and suffocation.

The chokes are a much more serious condition than simple bends. Again, nitrogen bubbles are thought to be the cause. The chokes may occur as the only symptom of dysbarism but more often are associated with the bends. They tend to progress more than the bends and to be more disabling.

When a person develops both symptoms, the chokes usually appear later in flight. Attempts to take a deep breath for relief only aggravate the cough and substernal distress. If the condition is allowed to progress, unconsciousness and collapse will result.

The chokes can lead to severe distress within a few minutes. When the condition is recognized, immediate descent is imperative.

Creeps – The creeps is a term generally given to the skin manifestation of dysbarism. Nitrogen bubbles cause pressure phenomena on nerve endings, adjacent nerves, and blood vessels.

You can have a rash or mottling of the skin or such sensations as itching, burning, tingling, or prickling, or you can even have loss of feeling. A fairly well-known manifestation of the creeps is the feeling that small insects are crawling over your epidermis.

All these skin sensations usually disappear without complications on descent. They are, however, a danger

sign because they represent warning of nitrogen bubble formation.

Dysbarism can also cause *disorders of the central nervous system*, although this is rather infrequent. Bubbles formed anywhere in the body can lodge in the brain and cause all kinds of central nervous system disturbances. Usually your vision or your orientation is affected. Some persons have reported a flickering or shimmering of vision, but the most common complaint is a transitory visual defect, a spot of partially decreased or totally absent vision.

Neurological symptoms can occur shortly after flight as well as during flight. Any symptom of this sort calls for immediate medical attention.

Denitrogenation

Breathing oxygen washes nitrogen out of your system and, consequently, is the best preventive of dysbarism, short of staying on the ground. Above 20,000 feet the effectiveness of denitrogenation is greatly reduced. In other words, to work, denitrogenation has to be an accomplished fact by the time you reach this altitude.

Generally speaking, it takes 2 hours of denitrogenation to give maximum protection against evolved gas dysbarism; however, 1 hour will give a considerable amount of protection. You do not have to eliminate all the nitrogen from your body to get adequate protection. Breathing pure oxygen at ground level for 15 minutes will reduce the incidence of bends and chokes at 38,000 feet by approximately half.

With reliable pressurization systems, instances of dysbarism in flight are rare. Dysbarism is not likely to occur in current operational flying as long as the cabin altitude remains below 30,000 feet. Nevertheless, cabin pressurization can be accidently and suddenly lost, either as the result of rupture of cabin integrity or from enemy action.

OPNAVINST 3710.7F, General NATOPS requires that if loss of pressurization occurs an immediate descent shall be made to a flight level where cabin altitude can be maintained at or below FL250, and oxygen shall be utilized by all occupants. The altitude restriction does not apply when a functioning pressure suit is worn.

When an occupant of any aircraft is observed or suspected to be suffering from the effects of decompression sickness (evolved-gas dysbarism), the pilot will immediately descend, land at the nearest installation and obtain qualified medical assistance. The person affected may continue the flight only on the advice of a flight surgeon.

Recreational Scuba Diving

Under normal circumstances, after scuba diving, compressed air dives or high pressure chamber runs, aviation personnel shall not fly or undergo low pressure chamber runs for a period of 24 hours because of the danger of dysbarism. *This is a General NATOPS, OPNAVINST 3710.7F, stipulation.* Under circumstances where an urgent operational requirement dictates, NATOPS states, flying personnel may fly within 12 hours of scuba diving providing no symptoms of aeroembolism develop following surfacing and the subject is examined and cleared by a flight surgeon.

After you have completed a scuba dive, the partial pressure of the nitrogen dissolved in your blood may continue to be elevated for a time, even in the absence of the clinical symptoms of evolved-gas dysbarism. If you fly under these circumstances, you are a candidate for the bends, the chokes, the creeps — the whole bit. The partial pressure of nitrogen will have returned to normal after a 24-hour surface interval. With normal blood nitrogen levels, it is then safe for you to fly.

In order to recognize an evolved gas-dysbarism emergency if you encounter one, knowledge of the symptoms described above is vital.

In summary you can do three things to minimize the effects of reduced barometric pressure on your body:

- Avoid gas-producing foods and beverages before flight.
- When possible, "denitrogenize" before ascent to altitude.
- Maintain your familiarity with the evolved-gas symptoms of dysbarism. Remember, if any of these symptoms should occur in flight, descent is the only treatment.

"Anyone for supper?"
"What's on?"
"Sauerkraut, franks and beans."
"URP!" ◄

In ground safety just as in flight safety, true success is achievable only as the result of the sum total of a wide spectrum of efforts diligently applied and vigorously supported by all.
Wish I'd said that.

Ace L.

...held fully accountable.

A SECTION of A-7s took the runway for takeoff. The leader lined up on the downwind side. After normal engine runups, with good engine pressure ratio checks on both aircraft, the leader commenced his takeoff roll. The wingman pulled his power back momentarily to 85 percent and readvanced it to MRT, commencing his takeoff roll 10 seconds after the leader.

At, or about the normal rotation point, the wingman raised his landing gear and settled back onto the runway in a gear up, nose gear door open configuration. After realizing he could not get airborne, the pilot dropped the tailhook and centered the aircraft on the runway with rudder, engaging the E-14 arresting gear. The aircraft came to a stop and the pilot exited the aircraft, uninjured. There was no fire.

Based on the pilot's original statement and other existing evidence, the aircraft accident board concluded this accident was caused by the pilot's rush to get the landing gear up after takeoff. However, subsequent to the board's deliberations, the pilot confided additional information to the commanding officer, which put a new light on the accident. He stated that prior to takeoff he had mounted a motion picture camera in the cockpit of his aircraft and was filming the takeoff of the lead aircraft during his own takeoff. His attention was focused on the field of view of the camera and he placed his hand on the landing gear during the takeoff roll in order to insure that he did not forget to retract his gear.

The pilot maintained that he did not deliberately raise the landing gear handle. Rather, he believes that at some time during the takeoff roll, he must have inadvertently moved the handle upward far enough to initiate gear retraction.

The commanding officer, in his endorsement, stated in part:

"By his delay in volunteering the information about his picture taking activity, the pilot denied the aircraft accident board the opportunity to consider this information before reaching its conclusion concerning the cause of the accident. The possibility of returning the report to the board was considered, but I have elected not to do so because I believe this information does not change the board's conclusion that the primary and only cause factor in this accident is pilot error in judgment. If the pilot's statement is accurate, the board's conclusion that the pilot erroneously felt he had established a positive rate of climb prior to raising the landing gear is incorrect. In essence, the board concluded that the pilot fell victim to the hazards of the 'hot' takeoff with premature landing gear retraction. Proper takeoff techniques and the hazards of 'hot' takeoffs were the subject of an all pilots' meeting which the pilot attended a short time before the accident.

"The board concluded that the pilot either deliberately disregarded this warning or was not able to recognize that this warning applied to his own takeoff technique. In view of his statement to me, I conclude that the pilot erred in attempting to perform an unnecessary and unauthorized function during his takeoff which diverted his attention and caused him to deviate from his established habit pattern. The latter failure in judgment is as serious as the former.

"In view of the pilot's late statement concerning the cause of this accident, it is appropriate to consider additional recommendations to prevent similar accidents in the future. One such recommendation is that this accident be used to remind aviators of the criticality of the takeoff maneuver and the hazards of breaking normal habit patterns. It might also be appropriate to recommend certain NATOPS restrictions which would specifically prohibit airborne photography during critical phases of flight. However, it is difficult to believe that any written directive can protect a pilot capable of a judgment failure of this type. I recommend instead that pilots who cause accidents through poor judgment or unauthorized actions be held fully accountable for the consequences of their actions." ◄


LACK

K of ATTENTION

EVERY year a number of accidents occur for reasons which are variously labeled as fixation, distraction, complacency, habit-pattern interruption, etc. The circumstances of the individual accidents vary, but they all have one thing in common: lack of attention by the pilot to some critical detail of flight *at a critical time*.

One endorser to an AAR commented:

"Human error occasionally overtakes someone in the aviation community, resulting in an accident of this type. The major tool currently available for helping to avoid such accidents is a persistent and relentless reindoctrination of all aircrews, followed by more of the same."

Thus, it may be beneficial to review a few of the many available examples of accidents which involved lack of attention to critical details.

Corsair II Flies Into Water at Night

An A-7B pilot was scheduled as wingman on a two-plane night surveillance flight from a CVA. In preparation for the flight, the wingman contacted the CIC coordinator about 1½ hours prior to takeoff to discuss the flight.

He read through the surveillance material provided by CIC and prepared kneeboard cards. He then visited the VAW readyroom where he talked to the officer who would be the air controller in the E-2B during the flight. This discussion brought out the fact that the "Hummer" crew would not know the exact area to be covered until their data could be updated by the off-going E-2B. The A-7 pilot was advised that if there were several contacts, it would be necessary to split the section.

The wingman then contacted his flight leader. Following a thorough brief, the two proceeded to the flight deck.

After a normal launch, the flight rendezvoused as briefed and checked in with "Tango" control (the E-2B). After investigating a contact while in formation at 3500 feet, the section was split by Tango control and vectored to individual contacts approximately 10 miles apart. The wingman was unable to detect a contact visually or on radar in his assigned area. He reported this information to Tango control. Tango responded with a new vector.

As he proceeded on his new heading at an altitude of 1000 feet and 300 knots, the wingman switched from Ground Mapping Pencil (20 NM scale) to Cross Scan Ground Mapping Pencil (10 NM scale) on the radar. He commenced flying the aircraft with his left hand while adjusting the brilliance and storage gain of the radar scope with his right hand.

Suddenly, he was aware of a reflection of light from the water through his port windscreen. Realizing he was extremely low, he immediately initiated a full power climb. Simultaneously with the change in attitude, he felt a single strong buffet which he took to be impact with the water. Although the radar altimeter warning limit had been set at 50 feet, the pilot could not recall later whether or not the warning light illuminated.

As the aircraft zoomed the pilot noted the airspeed and RPM deteriorating rapidly and, because of the extreme situation, decided to eject. After making a single radio transmission to the flight leader, stating that he had hit the water, he ejected. At the moment of ejection the A-7 was approximately 15 degrees noseup, 160 knots and at 800 feet.

The pilot was subsequently rescued with only minor injuries. Thus, he became one of a very select group of aviators who have flown into the water or ground at night and lived to tell the tale.

The aircraft mishap board commented on the pilot's failure to reset the radar altimeter (after catapult launch) and his failure to utilize the altitude hold feature of the AFCS (authorized by NATOPS above 500 feet). These are valid comments and, had the pilot used either the AFCS or radar altimeter to full effect, it is possible that the accident might not have occurred. Nevertheless, it seems clear that in addition to these procedural errors, the pilot simply became distracted or preoccupied with various tasks and failed to give sufficient attention to the critical flight parameter of altitude.

T-2B Into the Trees on Night Approach

A student naval aviator launched on his first night solo syllabus flight in a T-2B. After completing a short

roundrobin in the local flying area, he entered the pattern at homefield for touch-and-go landings.

After the first touch-and-go, he turned downwind. His downwind leg was wide due to a rather strong crosswind at pattern altitude. Off the 180-degree position, the student rolled into a steeper than normal left bank and retarded the throttle to 72 percent.

At the 135-degree position, the student noted his rate of descent to be about 1000 FPM, and leveled his wings. A small power addition was made thereafter and 750 feet indicated was seen on the altimeter (field elevation was 400 feet). The student knew he was low and added a small amount of power. This was insufficient, for . . .

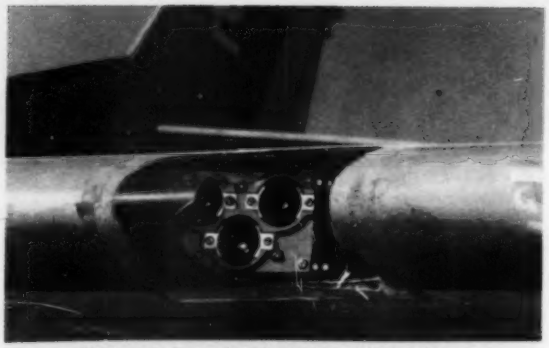
Within the next few seconds, he observed some dark vertical shadows, followed by "something gray." Still he did not add full power. After seeing more dark vertical shadows, accompanied by a "thud" and an altimeter reading of 500-550 feet, the student added full power and executed a waveoff.

Turning downwind, the student considered making a low pass for a gear check by the RDO but elected, instead, to make a full stop landing. As the port wheel touched down, the fixed fairing door on the main landing gear separated from its mounting. Otherwise, the rollout was uneventful.

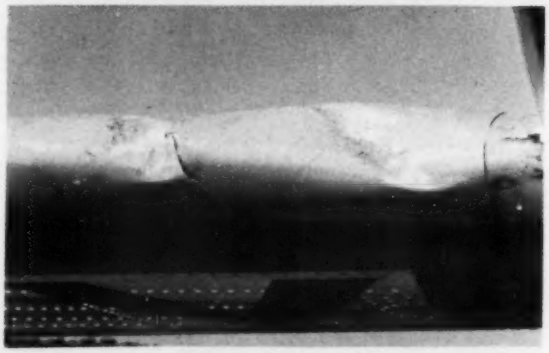
Postflight investigation revealed that the student had clipped the top of a dead tree and sheared the top of a live 3-inch diameter pine tree. The contact with the dead tree appears to have done little damage, however, the contact with the live pine tree broke the approach lights, dented the leading edge of the port wing, and deformed the tiptank.

The pilot apparently became preoccupied with the problems of a wide pattern to the point where he failed to give sufficient attention to maintaining altitude. He observed a low altimeter reading and unusual shadow patterns outside the cockpit. Yet, he did not execute a full power waveoff until after contact with the trees. Considering this, it appears that the student "fixated" on one or more of the tasks associated with flying the aircraft to the exclusion of maintaining proper altitude.

There are numerous other examples where pilot preoccupation was a factor. One involved a student pilot in a TF-9J. After breaking downwind he reduced power below that required for level flight. Being high and fast he left the throttle "aft" while the aircraft slowed. Off the 180 degree position, he experienced wingrock. He failed to diagnose the cause as low airspeed and became so engrossed in the problem that he neglected to add power. The aircraft continued to settle until it was dangerously low. The student ejected just before the *Cougar* "mushed" into the ground.



Shattered approach light fairing and wing dent.



Damaged leading edge of port wing.

Preventing accidents of this nature is very difficult. Witness the relative lack of progress over the years in eliminating unintentional wheels-up landings. Nevertheless, our efforts must be unceasing. Elements of command and supervision can assist by ensuring that pilots and aircrewmen are well-briefed and adequately trained for the flights scheduled. In addition, much can be done to eliminate distractions in critical areas of flight operations, e.g.:

(1) Providing simplified instrument approaches.

(2) Eliminating unnecessary low-altitude radio frequency changes.

(3) Simplifying missed-approach instructions.

(4) Promoting radio discipline.

Equally important, supervisors can help by taking every opportunity to dispel complacency and emphasize teamwork in the cockpit. The proper use of checklists and warning devices is invaluable in preventing accidents.

Each individual pilot must guard against fatigue, complacency, preoccupation, fixation, and distraction. In the final analysis, it is the individual pilot who must cope with the many demands for his attention. He must keep his situation in perspective – *fly the aircraft first and take care of peripheral demands as best he can.* ◄

That's Charlie

THIS is the story of two pilots, Easley Mohre, nicknamed Easy, and Sleighton Foxx, nicknamed Sly. They were pilots attached to the same S-2 squadron on one of the coasts. Their careers, as some are, were closely parallel. They had come from the same state, same college, entered the Navy about the same time, completed flight training the same month, been promoted to LT with the same date of rank, and married, not the same girl, but into the same family. They married sisters.

Easy and Sly were both CAPCs and did not have the opportunity of flying together too often. However, one day they did. The schedule was published scheduling them for a cross-country, instrument training flight. They decided to file for a commercial airport about 3 hours away, take a lunch break at the Nugget, try their luck with the galloping dominoes for a few minutes, and return to base.

Easy: Ya' know, it's flights like these, every now and then, that puts the fun back into flying.

Sly: That's Charlie.

Easy: I'll take it out and you bring it back.

Sly: Suits.

Easy: Speaking of suits. How's Suzy?

Sly: Compared to what?

Easy: Did you get a letter from Pop saying they're coming out for a visit?

Sly: That's Charlie.

The two pilots continued to "yak" as they walked to the yellow sheet counter to sign for the plane. They looked carefully at the various gripes that others before them had written about their aircraft-for-the-day. They did not see any repeat gripes and were confident as they walked to the flight line that they had a good bird. A thorough preflight was conducted and nothing amiss was noted.

Continued

After takeoff they were vectored, here and there, before finally being pointed in the desired direction.

Easy: Seems to me there's an easier way to get out of this area without all these turns, start climb, stop climb, and all the other mickey mouse.

Sly: That's Charlie.

Easy: Why can't they start us out on a radial, climb to an altitude, reverse course, and get on with it?

Sly: 'Stoo easy.

Easy: I was talking at happy hour just last week to a couple of gyrene rotorheads . . .

Sly: Say no more.

Easy: . . . . they're working with FAA on a route east, with different altitudes at various checkpoints, to expedite their flights, and not have to take those choppers up so high.

Sly: Sounds goodly.

Easy: Goodly?

Sly: Yeah, better'n just good.

They continued their conversation for most of the way to destination – interspersed with an occasional report to Center. The P-field to which they were going was reporting a broken deck at 1500 feet with visibility unlimited. They were cleared for an approach, crossed the VORTAC outbound, and began a letdown to the prescribed altitude. Their procedure turn was a thing of beauty. They chugged inbound on radial and crossed the last intersection on altitude. As they began their final descent toward the airport they broke out of the clouds and were lined up with the runway. On the pipper.

Touchdown was 1000 feet past the numbers and the concrete seemed to stretch to the horizon as they were rolling out. It was a long "mudda."

Easy began taxiing to the parking ramp. Ground control directed him to follow a van which came out to meet the aircraft. He followed the van to the ramp which was badly in need of repair. There were numerous holes, large cracks, and considerable loose gravel.

Easy: I don't like the looks of this.

Sly: Me either.

The van stopped, a civilian taxi director got out, and began giving taxi signals. Both pilots were concerned with the rough area and were concentrating primarily on the surface without watching the director too closely. Numerous light and telephone poles lined the edge of the ramp. The taxi director realized the plane was getting near the poles and signaled for a left turn.

Easy, smartly turned left and when he did the right wingtip contacted a telephone pole. When the taxi director saw the pole sway he gave the pilot a cut.

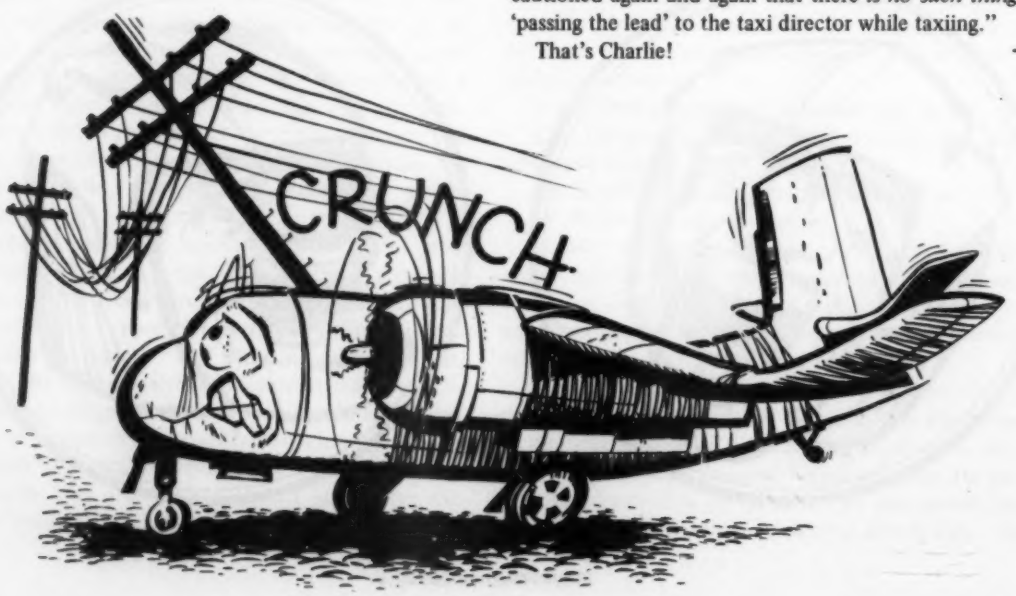
Easy: Brother, we've hit a pole.

Sly: That's Charlie.

The squadron *second guessers*, after hours of deliberation, deduced that the incident was caused by pilot inattention. Even though Easy and Sly noticed the poor condition of the ramp and had reservations about continuing to taxi, they did taxi and allowed their attention to be directed to the surface conditions to the exclusion of their surroundings (tunnel vision). The taxi director was unfamiliar with the dimensions of the S-2 and didn't allow enough margin for the wing.

The pilot's CO assigned 100 percent pilot error and allowed as how, "it was difficult to understand how two CAPCs with as many hours experience from taxiing in tight places on darkened flight decks could hit a pole while taxiing in broad daylight . . . Pilots must be cautioned again and again that there *is no such thing* as 'passing the lead' to the taxi director while taxiing."

That's Charlie! ◄



ARE YOU LEGAL?

Reprinted from the Flight Safety Foundation Accident Prevention Bulletin 72-2, Feb. 1972

YOU are cleared to land on runway 28R at PIT. The weather is clear. The runway surface is dry. But there's a 35-knot crosswind from 325 degrees. Your maximum allowable crosswind component is 26 knots. Are you legal?

In many cockpits this question is generally followed by a scene of gyrating crewmen plunging into the frustration of unearthing their wind component chart. Which manual? What section? What page? Find the intersection of wind angle and velocity. Follow the line down. Whoops, is that the one? Let me retrace it . . .

Sound familiar?

One airline captain offers a quickie guide to reduce this rain dance. A crosswind component is calculated by multiplying the wind component velocity by the sine of the angle between runway and wind heading. With this in mind, the captain has memorized the sine of angles 30 degree, 45 degree, and 60 degree (.5, .7 and .9 respectively). He can then make a rapid calculation of his crosswind component using his given wind and the sine of the angle closest to the actual wind angle. If the wind angle varies somewhat from his representative angles of 30 degrees, 45 degrees, and 60 degrees, he can make a reasonably accurate interpolation.

Using our hypothetical case at PIT, the wind angle is 45 degrees. The sine of 45 degrees is .7. The wind velocity of 35 knots multiplied by .7 computes to a 24.5-knot crosswind. Thus, in this situation, you would be legal.

Let's suppose the wind shifted to 340 degrees – same velocity. This makes a 60 degree wind angle, the sine of which is .9. The wind velocity of 35 knots multiplied by .9 computes to 31.5, and so, in this situation you would not be legal.

This principle can be used in quickie tailwind/headwind component computations too, except that you would use the cosine of the three angles. Since the cosine numbers are the reverse of the sines, they are easy to remember.

Given:	Wind angle	Sine	Cosine
	30 degree	.5	.9
	45 degree	.7	.7
	60 degree	.9	.5

Formula: Wind angle sine X wind velocity = crosswind component.

Wind angle cosine X wind velocity = tailwind/headwind component. ◄

Sunburn Time

MANY of our navymen are in areas where sunburn time is all the time – year 'round. However, the months are approaching when sunburn becomes a hazard in some sections of the various continents and oceans as winter becomes spring and spring turns to summer.

Last April, a man fell asleep for 5 hours while sunbathing on a beach. He suffered heat exhaustion and severe sunburn on his back, legs, and arms which laid him up for 5 days.

The following month, a similar case was reported from a CVA. A man on a 1-hour break from the galley went to the sponson to get a suntan. He fell asleep for an hour-and-a-half and subsequently had to be admitted to sickbay because of sunburn-swollen ankles. His severe sunburn was extensive – over 40 percent of his body.

These are but two examples of the sunburn injuries occurring throughout the Navy. While sunburn may not seem the most serious of subjects, at times it can be dangerous, (not to mention the cumulative effects of aging skin and skin cancer). And, strictly speaking, a man off the job is *a man off the job*, no matter what the cause.

If you set out to acquire a suntan on the beach, at poolside, or just sprawled in a sunny corner somewhere, take it easy and do it gradually. Ten or 15 minutes on a side is quite enough for the first day if you have no tan at all. If you must bake longer, do it before 1000 or after 1400; the sun's rays are strongest in the 4 hours inbetween. Increase your daily dose of sun by about 5 minutes each successive day, and don't forget that you can still burn on a cloudy or hazy day.

If you are a towhead and sunburn is something you don't care for, don't work without a shirt. Use common sense about the sun. See your medical department or flight surgeon for an effective sunscreening cream or lotion.

Incidentally, engine oil or lubricating oil should never be used for a sunburn lotion. Toxic ingredients in such oils can be absorbed through the skin.

And remember, if you are on the schedule for night duty, protect your eyes from bright sunlight during the day. Wear your sunglasses. Prolonged exposure to bright sunlight reduces your night vision. According to the *U.S. Naval Flight Surgeon's Manual*, lying on a white beach in bright sunlight without sunglasses can significantly reduce your ability to dark-adapt for as long as 36 hours.

Discomfort and Distraction

WE must appreciate that many of the minor nuisances like head colds, sore throats, earaches, chest colds, hay fever, flu, abdominal cramps, etc., while mostly just bothersome on the ground, can become serious conditions in flight.

Colds can cause painful or damaged ears with, perhaps, upset of the inner ear and vertigo. Earaches usually mean the middle

notes from your flight surgeon

ear is already infected, and drum damage may result from flying. Hay fever usually causes trouble in equalizing pressures. Flu and abdominal cramps may cause inconvenience from diarrhea, incapacitation from expansion of trapped gases, or decreased resistance to heat and "g" stress (i.e. easy fainting) . . .

While these things may not happen in every instance, the most consistent result of flying with minor illness is a lowered level of performance and efficiency simply because of *discomfort* and *distraction.*

Increase the Odds

A PILOT in the water after ejection thought the crew of the approaching SAR helo didn't see his flashlight or his strobe.

He directed his flashlight beam on the reflective tape of his helmet to increase visibility. The helo crew spotted him immediately and pickup followed.

Shining your flashlight on your helmet tape is good headwork, particularly, if you find yourself without a functioning strobelight.

Helmet Hit

A PLANE captain on the flight deck at night was struck in the head by an unknown object. Thanks to the HGU-25P helmet shown in the accompanying photo, he was uninjured.

"I was awaiting the return of my aircraft," he says, "when I felt a blow on the back of my safety helmet. My aircraft had trapped so I began to tie it down and get ready for the next launch.

"When I returned to the plane captains' shelter, I took my helmet off. I was astonished to see the large dent and crack.

"If it hadn't been for my safety helmet, I might not be around today."

"The flurry of the flight deck and untold stories of hazards are evidence of the need for proper flight deck apparel," the squadron CO stated.

100 Percent

WHILE trying to avoid one danger during night air ops, a plane captain on a carrier flight deck was injured by another.

An aircraft was being taxied across the bow for parking forward on the starboard side. As it neared the No. 1 catapult, the plane captain crossed in front of it. He was paying particular attention to the aircraft intake and stepped on the catapult track. The retracting shuttle struck his left foot.

"Whenever possible," the investigating safety officer states, "announcements are transmitted over the 5MC for all hands to *stand clear* when shuttles are retracted."

Catapult crews must ensure personnel and aircraft are clear of the track prior to shuttle movement.

Remember that the flight deck is inherently dangerous. Stay alert 100 percent of the time.

Comment Required

"SEVERAL incorrect uses of equipment by the pilot prior to a TA-4J ejection require comment," the investigating flight surgeon states.

The pilot did not wear his anti-G suit or his lifevest on this flight. At the time of the emergency at 17,000 feet, he was flying with his oxygen mask hanging by one side. (The cockpit was pressurized to 9000 feet.)

"I don't believe that hypoxia had a role in this mishap," the flight surgeon writes. "However, because the pilot's oxygen mask was improperly secured, he could not transmit a Mayday, request aid from his rear seat crewman, or inform him of intent to eject.

"Fortunately, the crewman was alert to this possibility and actually was better prepared than the pilot for the emergency. He was wearing his anti-G suit, lifevest, and helmet with oxygen mask attached."

The flight surgeon recommended enforcement of existing NATOPS and other regulations concerning life support and survival equipment.

Here's a Peculiar One

POWERPLANTS, controls, systems, switches, and sundry equipment installed in aircraft at various times have refused to operate normally for no apparent reason. The severity of the malfunction usually determines the amount of time and effort in troubleshooting. An engine which inexplicably quits or runs rough is not a matter to be treated lightly. Mechs will swarm all over the "bad actor" trying to put their fingers on the cause of the trouble.

One dark night the pilots and crew of a CH-46 fired up their trusty bird to return to their floating home-away-from-home. Now it just so happened that between their departure airport and the ship lay some fair size mountains. The IFR plan, which the HAC had filed, required an MEA of 9000 feet for about ½ hour prior to crossing the coast.

After leaving the coastline the HAC commenced a letdown – 1500 fpm in an easy left-hand spiral. PMS (Power Management System) was not engaged. While descending through 3000 feet the No. 1 engine lost the load and went to ground idle (N_g-59, N_f-70, Q-zero, T_5-550). The copilot, who was then flying the plane, lowered collective to retain rotor RPM, but No. 2 N_f and N_r remained at 100 percent.

The HAC took control and pushed the engine condition levers full forward. Number 1 remained at ground idle, but No. 2 N_f and N_r went to 105 percent. A quick jerk of up collective was induced to see if No. 1 would take the load. It did. By this time the helicopter had descended to 2000 feet. Both engines were back on the line with all indications normal.

The ship was notified and descent at 500 fpm was continued to 1000 feet. Upon reaching this altitude No. 1 engine lost the load again momentarily and the HAC brought it back the same way he had restored it the first time – quick up-collective jerk. The second failure occurred as power was reduced to 30 percent Q. The collective was positioned at 40 percent Q and an extended, slow, high-power approach was continued to the ship. The HAC kept 103 percent N_f/N_r and was

ready to actuate the emergency throttle if the need arose. The approach was continued and an uneventful landing made.

After touchdown, collective was rapidly lowered to see if the No. 1 engine discrepancy would recur. It did! The ECL on the No. 1 engine was then positioned in ground idle with only a small drop in N_f/N_g noted. Moving the ECL back to FLY produced no change in power indications, neither did movement of the beep switch. The emergency throttle was actuated and No. 1 N_f then beeped to 100 percent. The No. 1 torque matched No. 2 and normal load share occurred. Number 1 engine emergency throttle was reset and the engine retained the load share. Movement of the ECL and beep trim produced normal response. The aircraft was chained to the deck so gradual up-collective power could be applied, followed by rapid down-collective motion to attempt to induce the failure. The engine responded normally. The engine was shut down and inspected for FOD or material failure of any assemblies. Everything was as it was supposed to be.

Probable Cause

Now what! Obviously something was wrong. A blockage of the bellows in the No. 1 engine fuel control was suspect. Since the bellows do not function until about 5000 feet, when they lean back to compensate for density variance, it follows that the descent from 9000 feet must have caused the bellows to stick, pressure not to dump, and an excessive lean condition to drive the engine to ground idle. The rapid up-collective movements and actuation of the emergency throttle accelerated fuel flow and dumped pressure until the pressure equalized, didn't it? The aircraft was released for flight and the next day it flew over 4 hours, below 1500 feet, with numerous autorotations, failing to cause any further problems on No. 1 engine. The HAC had been through a similar experience in H-3s, some years ago, in prolonged descents or he would have been most reluctant to yank up collective.

The Real Reason

Subsequently the engine was dropped and sent to the DOP at Cherry Point for DIR. There, investigation of the engine revealed nothing adverse. The bellows and the rest of the fuel control operated normally. However, the real reason for the malfunction came to light during a cursory, electrical circuit check. The electrical harness to the fuel control was shorting out. Meanwhile, the squadron which had experienced the problem had installed a new harness when the replacement engine was installed and correctly, even though inadvertently, solved the problem.

Other Thoughts

In the February 1972 issue of APPROACH, an article, "Is the Aircraft Really Ready for Flight?" made many good points which apply in this case.

- *Ground checks OK.* The HAC was able to induce the engine malfunction after landing, so the caution flag should have been two-blocked immediately. When the FOD inspection disclosed no damage, other troubleshooting measures were necessary. It is easy to see how the flight the next day, with everything operating normally, must have lulled the maintenance folks. However, there must have been doubt in the minds of more than one person.
- *Coming up with the correct answer.* The solution of the problem was not easy. Even though the fuel control was highly suspect it did not rule out other possibilities. Later events, of course, revealed no problem with the fuel control.
- *Decision making.* Maintenance folks, when faced with sticky problems (almost daily), need time, occasionally special equipment, and consultation with tech reps to solve unusual and peculiar problems. When safety of flight is involved (for which a bird with a sick motor qualifies), there should be no thought given to flying the aircraft until all reasonable steps have been taken in fault analysis to isolate and correct the problem. ◄

Fail-Safe

"THE BEST fail-safe provision in the cockpit is proper teamwork. Optimum teamwork, however, is always preceded by a thorough (not a lengthy) briefing by the pilot-in-command and possibly the copilot when acting as flying pilot. It is the solid basis of teamwork, from which mutual confidence and assistance develop into mutual cross-monitoring and cross-checking, without hesitation to call the other crew-members' attention to any performance which is outside of given tolerances. This habit of mutual help, of early detection and elimination of each other's mistakes and errors, makes for the highest safety factor of a multiple crew.

Courtesy Flight Safety Foundation
Accident Prevention Bulletin 71-11
December 1971

BRAVO ZULU

THE CONTEXT of a message sent by the Commanding General, Second Marine Air Wing, to the Commanding Officer, NAS Norfolk, follows:

"On the afternoon of 28 January 1972, a CH-53D helicopter from the Marine Corps Air Station, New River, North Carolina, crashed at NAS Norfolk following a mechanical malfunction in flight. The air station crash crew reacted instantaneously with the utmost professionalism and courage. Within seconds, they were extinguishing the flames and rendering aid to the passengers and crew. As a result of their courageous actions, the lives of the 41 passengers and crew were saved and injuries kept to a minimum.

"Again, on the evening of 31 January 1972, the NAS Norfolk Crash Crew was called upon to render assistance to another Marine aircraft. An OV-10A had just departed NAS Norfolk when an inflight engine fire developed. The aircraft turned back to the field for an emergency landing and the crash crew again reacted swiftly and automatically. The burning aircraft landed on the runway without brakes. While the pilots were attempting to bring the aircraft to a halt, *the crash crew was already in action, spraying the burning engine on the roll*. As the OV-10 came to rest with a collapsed main landing gear, members of the crash crew were fighting the fire and assisting the pilots. Their swift actions allowed both pilots to walk away unharmed.

"It is apparent to this command that the individual actions of the air station crash crew are responsible for possibly saving the lives of as many as 43 crewmen and passengers. Their timely and courageous efforts are deserving of recognition. Their professionalism and dedication to duty have earned them the respect of each and every member of the Second Marine Air Wing. Please extend my heartfelt gratitude to the members of your fine crash crew. Their actions were in keeping with the highest traditions of the naval service. G. C. Axtell, Major General, USMC."

APPROACH can only add a sincere WELL DONE.

Above: The OV-10A
Right: The CH-53D

The HOTSPOT is manned and ready.

Above: Had they been needed, the NAS Norfolk boat crash crew was ready.

Right: NAS Norfolk tower personnel relayed timely and accurate info to the crash crew.

The alarm is sounded and the crash crew responds.

What Else Do They Do?

IF there are any flight crewmen who think that a crash crew has nothing to do but sit in the firehouse, think again! Besides extensive day to day training, they have many other important responsibilities. Some are listed below:

Wheels watch. Ensure that all aircraft landing at the airfield have wheels down and locked.

Operate and maintain runway arresting and abort gear.

Provide fireguard for first runs (new engine starts), red labels (hazardous aircraft cargo loading and unloading), and during AirEvacs (hospital evacuations).

Conduct runway inspections each morning for FOD and ensure that operating areas are safe for aircraft.

Provide flight line fire protection and maintain CO_2 bottle pool.

Provide fireguard for aircraft fueling and defueling and for aircraft with hot brakes.

Wash down or foam areas as necessary when fuel spills occur.

Supervise airfield maintenance and snow removal (where necessary).

As you can see, naval air station crash and rescue crews have vital tasks to perform. Whether the crews are made up of navymen or civilians, crash crews have a reputation for doing an outstanding job. Their working hours are long and their work tedious. To a man, however, the crews are dedicated to the saving of lives and the preservation of vitally needed aircraft and equipment, and many have sacrificed their lives in the line of duty.

If you are a pilot or an aircrewman, and you haven't already done so, take a few minutes to visit your local crash and rescue branch. It could prove to be quite an education.

From time to time we receive letters which are too lengthy for printing on the regular Letters to the Editor page. One such letter pertains to a matter of widespread interest and is reprinted here as a separate article.

DESIGN FACTORS IN ACCIDENTS

Pensacola, Fla. – The March 1971 APPROACH article on aircraft accidents due to fuel exhaustion cited "pilot factor" as the primary cause in 55.7 percent of the accidents. While I believe that ultimately the pilot is responsible for his aircraft and crew, I also believe that many Navy aircraft have design deficiencies which lead to accident-producing errors. For many such accidents attributed to pilot error, the error is more likely a *result* of poor design than an independent *cause* of the accident.

For example, two T-2B accidents were mentioned in which student pilots are "believed to have operated the landing light switch instead of the fuel transfer switch as they intended to do. These errors were undetected because the students failed to understand/monitor the operation of the fuel transfer system."

At the time of the accident (an airframe change has since been issued), the landing-taxi light switch on the left console was of the same lift-lock construction and feel as the fuel transfer switch. The switches are approximately 2 inches apart and both are situated in positions which encourage tactile (touch) checks rather than visual ones. If known human factors principles had been followed during design, the switches could have been molded or shaped to provide tactile cues. AFC 125, Part 1, issued 19 months after the first accident to remedy the oversight, utilized tactile cues as a means of switch differentiation.

In situations such as formation flight, ordnance delivery, and takeoffs and landings, pilots often cannot and should not rely on vision for control or switch actuation checks. Switches and controls differentiated by shape or method of actuation are a necessity, particularly when their confusion may have drastic consequences (like low-level flameouts). This concept has been well-established for more than 25 years, arising from an excessively high number of such "pilot error" accidents during World War II.

When the design or physical characteristics of equipment causes incorrect actuation of controls and installation of parts, the users should report the deficiencies (via URs, Beneficial Suggestions, maintenance safetygrams, crumpled note, etc.). It is essential that other personnel using the same equipment and the various systems commands be informed of a deficiency before it produces additional "pilot error" mishaps. The Safety Center has played a major role in this effort, but more is necessary. If such design problems can be avoided in initial design, or corrected as they are determined in use, a great many pilot error accidents need never happen.

W. F. Moroney, Ph.D.
LT, MSC, USN
Head, Human Factors Engineering Branch
Naval Aerospace Medical Institute
Naval Aerospace Medical Center

• Well stated! The Naval Safety Center is continuously on the lookout for design problems which may induce errors. This holds for aircraft already in the Fleet as well as those being developed. When identified, the problem is passed on to NAVAIRSYSCOM for possible correction.

Some design problems are too costly to permit correction in existing models, and procedures must be developed to compensate for the problem. The burden of correctly performing the procedures rests with the pilot. If the procedures are not properly performed and a mishap results, then the pilot must be considered a factor in the accident.

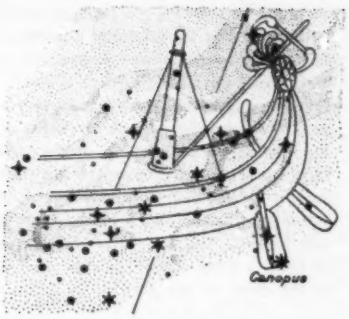
Editor

Letters

to the Editor

Experience is what makes you wonder how it got the reputation of being the best teacher.

Ace L.



The Constellation Argo.

Light Up

FPO, San Francisco – Station SOP here at MCAS Kaneohe for overwater day or night hovers requires the placement of a flotation signal flare upwind of an intended pickup point. Multiple flares may be used if desired. This procedure, especially at night, allows a steady hover to be maintained while the crew chief directs the pilot in making minor fore and aft or lateral position corrections. We feel that this procedure is superior to the procedures outlined in the UH-34 and UH-1 NATOPS manuals.

Until all Navy and Marine Corps SAR units are equipped with helos capable of automatic hovers and approaches, it is suggested that NATOPS procedures be changed to direct upwind flares for night overwater hovers.

Capt T. Buscemi
H&HS Operations

• Your suggestion makes sense to us from every angle. Anyone who has made a night pickup without any reference will buy it too. We recommend you initiate a regular NATOPS change request to the model managers for the UH-34 and UH-1. Further, see "Check Your 12" in the March 1972 issue of APPROACH.

APPROACH welcomes letters from its readers. All letters should be signed though names will be withheld on request.

Address: APPROACH Editor, Naval Safety Center, NAS Norfolk, Va. 23511. Views expressed are those of the writers and do not imply endorsement by the Naval Safety Center.

The Backwards Step

Oklahoma City, Okla. – "The Backwards Step," page 29 of the Jan 1972 issue of APPROACH recounted the first instance of reverse thrust – allegedly by a British pilot of an Anson back in '40.

The account reminded me of a similar incident that occurred one severe winter day in northeast Wisconsin. There was only one runway open, 1-19, with snowbanks from 8 to 10 feet high, piled on both sides of the taxiways and runway. It made taxiing an old C-18S, *Beechcraft*, with "walking gear" a mite tedious to say the least.

Although we could not see the tower or anything else, we were progressing nicely with radioed instructions from the tower. We negotiated the turn from the taxiway onto runway 1 – preparing to taxi to the end for a takeoff on 19.

About halfway down the runway I began to wonder where or how I would conduct a runup on the packed snow. I was startled into reality when my copilot yelled, "Aircraft on final!" I raised my eyes, and sure enough there was a plane, coming right at us, *starkly close*! Where to go? The walls of snow were solid!

Frantically, I firewalled No. 2 throttle and jumped on the left brake. Halfway around in the turn I pulled No. 2 throttle back and advanced No. 1 to full bore. Miraculously, the aircraft straightened out almost immediately – parallel with the runway. Quickly No. 2 was brought up and we made our takeoff.

Climbing out, the copilot looked back and advised he could see nothing behind us but blowing snow. I replied, "Boy, in a case like that, *never* look back." At that time, it was my closest venture to reverse thrust.

Ronald R. Templine
Pilot, FAA Aeronautical Center

• As neat a piece of groundsmanship as we have heard. 'Tweren't quite the same as the Anson bugger but 'twas spectacular. Your story ended so quickly we wonder *wha' hoppen* to the landing aircraft that had you boresighted?

Hands Full

NAS Norfolk – We are writing you in regard to your very interesting article, "Hands Full," January 1972 issue of APPROACH, pages 6 and 7.

Since the flight engineer normally starts and stops the engines of the P-3, we were wondering what he was doing when all these malfunctions were taking place. According to the article, the only malfunction indication on No. 2 engine was a chips light; in which case the No. 1 engine should have been restarted prior to securing No. 2 engine. The NATOPS procedure for both malfunctions is to feather, unless a greater emergency exists. The greater emergency being a possible No. 4 generator mechanical failure, so No. 2 engine should have been restarted after securing No. 4 engine.

E. F. Brennan
CNAL P-3 F/E Evaluator

• The flight engineer was busy too. It was he who played an equally important part in the sequence of events and he should have received credit in the Short Snort.

The CO said, "The No. 2 engine was secured for the chips light as prescribed by NATOPS. Airspeed, altitude, and

weather at the time were such that additional power from a third engine was not required until the No. 1 engine could be brought out of the loiter condition. The No. 4 engine was also secured as prescribed by NATOPS.

"Although it could be argued that a greater emergency existed by virtue of No. 2 being already secured, the weather from on station to Homeplate was such that it presented no problems for a two-engine transit and a VFR approach and landing. The pilot . . was prepared to bring a third engine back on the line in the event of any adverse condition."

Of Proven Value

FPO, San Francisco – While attempting to connect the catapult holdback assembly on an S-2E aircraft during carquals, Airman Larry V. Cortinas was struck in the head by the aircraft's tail as it spun sharply inboard. He was wearing the standard flight deck impact helmet. The blow knocked Cortinas to the deck and split the large impact-shell completely in half. He was uninjured, however, and recovered from the blow within seconds. I think this helps prove the importance of wearing the impact helmet.

CWO-2 G.C. Mergler, USN
USS TICONDEROGA (CVS-14)

● **It certainly does! Despite the "cussing and discussing" of carrying around the extra weight, this impact helmet has numerous saves to its credit. What more can we say – the photos tell the story.**

Folded-Wing Takeoffs

NAS Quonset Point, R.I. – This is in regard to your APPROACH article in the October 1971 issue entitled "Pit Traps and Wingless Flight." Since there is quite a high rate of takeoffs with wings folded on some aircraft, and all that seems necessary to accomplish this error is to have the capability of folding the wings, something needs to be done.

In the days when I was a P2V-7 plane captain, several attempts were made to takeoff with the controls locked. In the gust-lock mechanism, there was an interlock which prevented the application of takeoff power to the engines. A like interlock could be designed for use during wing-fold operation. This would prevent even a non-checklist-reading pilot from becoming airborne.

The wing-fold lever interlock could be disarmed or disconnected for high power requirements by maintenance personnel.

ADJC W. L. Bourgeois, USN
VXE-6 Quality Assurance

● **As you observed, wing-folded takeoffs are a continuing problem. The Naval Safety Center has been very active and communicative in its attempts to provide a workable solution for a "cure." Attempts to date, to install positive systems such as you recommend, have been unsuccessful due to the cost and added complexity.**

The use of a system requiring disconnection during maintenance is not a solution desirable from a safety viewpoint. The philosophy presently employed on the two new weapon systems under development (F-14 and S-3) is to provide a cockpit warning light when the wings are folded. It is hoped that this light, along with a better engineered system of activation and deactivation of the light, will provide at least a major reduction, if not complete elimination of wing-folded takeoffs.

Thank you for your interest and ideas. Please feel free to submit any suggestions you may have in the future; remember, "safety is everyone's business."

Wait for the Signal

FPO, New York – Recently a transient pilot on our line was given a signal to fold wings so the plane captain could pull the wing struts. While the plane captain was removing the struts, the pilot started spreading the wings without warning. This could have caused serious injury to the plane captain, not to mention damage to the aircraft.

I feel that pilots who are not in the squadron should be briefed on squadron procedures *before* they man aircraft for departure.

A Concerned Airman

● **Right you are. All concerned must take measures *in advance* to ensure that transient pilots and line personnel are in agreement on the procedures to be followed during the poststart checks and during departure from the line.**

Likes Article

Annapolis, Md. – Permit me to offer an admiring tip of the editorial hat to CWO Meyn for "The Overdue Hummer" (February 1972 APPROACH). The author rates an "E" (exceptional) for being able to crowd in an old fudd like me for an impressive jump-seat ride that, hopefully, will also prove a memorable one for other, younger, cockpit types. I only wish I'd written that last line!

With every good wish for what, of course, is my favorite service publication.

CDR R. P. Brewer, USN (Ret)

● **You are kind, indeed. On behalf of CWO Meyn and our staff, we thank you. For the benefit of readers, CDR Brewer served as Managing Editor of APPROACH from its first issue in July**

1955 through the July 1957 issue. He was responsible in large part for getting APPROACH off to a good start. He is presently Editor of the U.S. Naval Institute Proceedings.

"Wanted: Authors"

Langley AFB, Va. – Enclosed is the December 1971 issue of our base flying safety newsletter. We included your excellent article, "Copilots are Alive and Well," for publication on page 4 of our little rag.

It has exactly the tone for which I've been tugging on my poor talents in an effort to help "poor, neglected" copilots feel there really is a reason for their existence (even though we fighter pilots *know* there really is NO excuse for 'em!).

I have a question: Could you get Mr. Mooberry (author of "Anthropopathy") or Mr. Wiedeman to do something for navigators and flight engineers? I'd love to plagiarize that too, with appropriate credits, of course.

Thanks for letting me share your mighty fine works with blue suiters of a different cut.

Major J. T. Bales, Jr., USAF

• **Dear Major:**

Perhaps somewhere out there in the Fleet, some navigator or flight engineer who has a cross to bear, or burn, will share his thoughts in the form of an article for APPROACH.

Asking someone who is not a navigator or engineer to write "their side" of flying would be tantamount to asking a fighter pilot to write on the hardships of flying transports.

Thanks for the good review of APPROACH articles. Stand by for one like you've advocated. – Ed.

What You Don't Know Can Hurt You

APO, New York – I'm an Army helicopter pilot and read APPROACH when I can get a copy. I find it very informative. In the August 1971 issue of APPROACH the article, "What You Don't Know Can Hurt You," has me mixed up.

My question concerns the fourth paragraph where LCDR Mohr, the author, states:

"Interestingly enough, autorotation or low power is the recommended way to get down if you suspect a transmission failure to be imminent."

Our own magazine, *Aviation Digest*, of January 1972 carried an answer to a query concerning transmission failures where "Danny" says,

"I had one fellow say, 'Minimum power? Autorotate!' Don't get sucked in, friend, best thing to do is keep power applied to the drive train."

Both articles are concerned with multiengine helicopters. Which is correct? One or the other must be.

CW2 James G. Hayward, III Av
HHB, 3rd ADA (Divarty AV)

• **Far be it from us to get into one of those contests with Danny. He's an august ole codger, second only to Grampa Pettibone. LCDR Mohr, in writing his article, addressed both recip and turbine helicopters and pointed out some pitfalls of autorotation in single-engine helos. He opined low-power descent is preferred but whatever you do, comply with the procedures spelled out in the NATOPS manual (DASH-10) for your particular model, and get down ASAP.**

CG Rescue Basket

St. Louis, Mo. – The comments in the letter to the editor titled "Coast Guard Rescue Basket" in the Dec '71 APPROACH, in my opinion, are very true. Now being retired, I need no further rescue efforts by the Coast Guard, but I would welcome them in any event and with complete cooperation.

Needless to say, some young and old airplane jocks fail to realize that the Coast Guard rescue mission is made only as simple as the rescuee makes it. If something goes awry, they are quick to find fault with the system. When pure panic takes command, then the *best* is not enough.

In the early days of WW II, we were required to pass some very rigid survival tests. I knew not one stroke of swimming before commencing my training, but I learned very quickly when my future was to be at stake.

These were the days "before chopper." If each airplane jock could be "rescued" in a basket during training, then later, his plight would be made more simple.

John W. Hajek, CDR (Ret.)

• **In theory we agree with you – the more experience a man has in training with the actual rescue devices he may encounter later, the better. However, this is not always possible. For this reason, we published the item on the Coast Guard basket (June 1971 APPROACH) to help familiarize Navy pilots and crewmen with this method of rescue. Our correspondent's comments in the December 1971 APPROACH seem to have further assisted attracting attention to this item!**

Glad to have you still among our active readers.

The new garlic diet is a success, from a distance you really do look thinner.

Ace L.

Vol. 17 **approach** No. 11

RADM W. S. Nelson
Commander, Naval Safety Center

Our product is safety, our process is education and our profit is measured in the preservation of lives and equipment and increased mission readiness.

Contents

Departments

NavAir 00-75-510

Purposes and policies: Approach, published monthly by the Naval Safety Center, presents the most accurate information currently available on the subject of aviation accident prevention. Contents should not be considered as regulations, orders or directives and may not be construed as incriminating under Art. 31, UCMJ.

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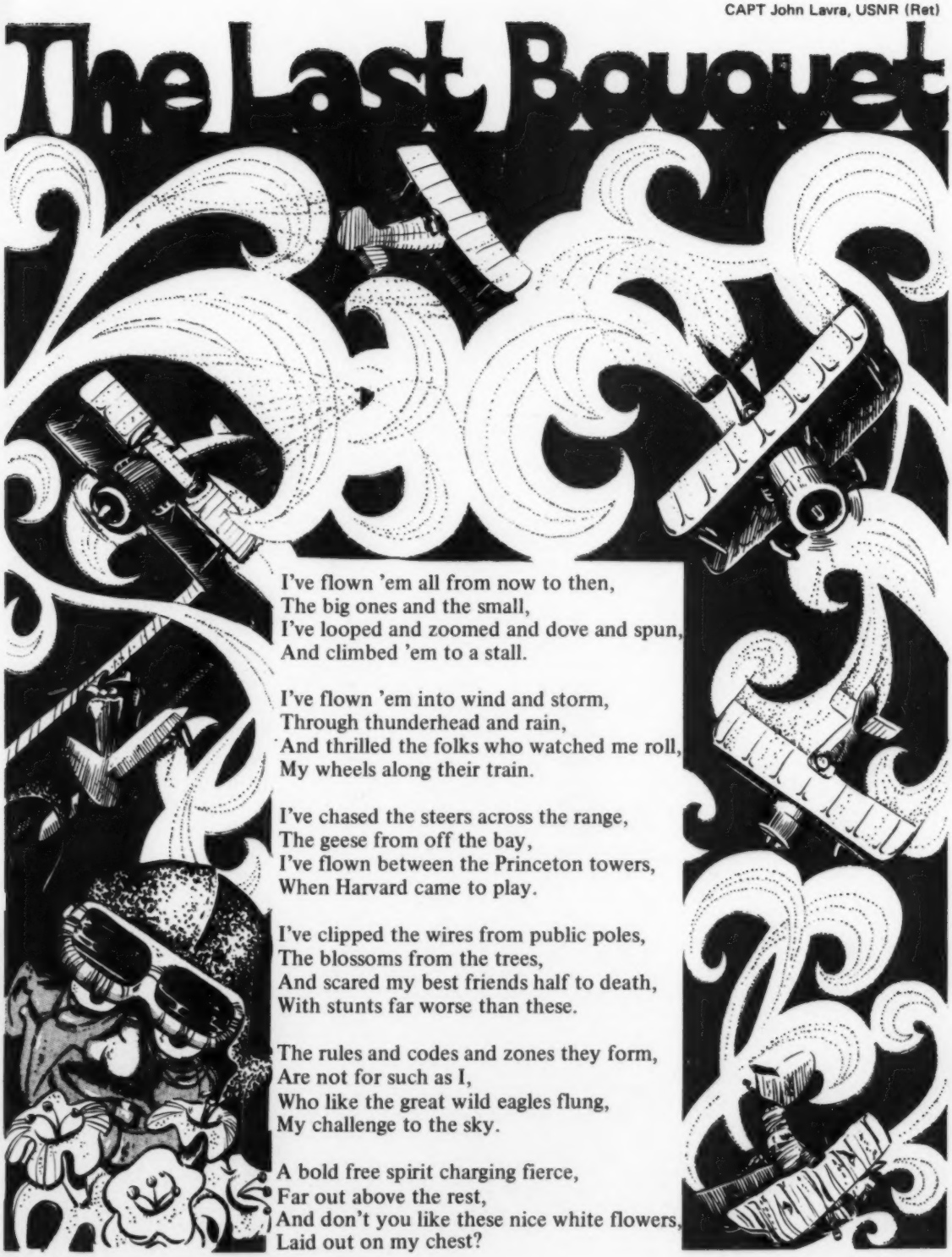
Credits

This month's cover by Blake Rader honors the OV-10A proving its worth in the field with its versatility and tactical capability. Pg. 8 Photo: Bell Helicopter. Pg. 10 Photo: PHC R. L. Lawson. Pg. 11 Photo (top) PHC W. M. Cox, (bottom) PH1 Wilson. Pg. 12-13 Photos: PH3 Joseph Marino. Pg. 18 Photos: PH2 R. A. Brown, VFP-306. Pg. 20 Photo (bottom) CPL Carl Davis. Pg. 26 Photo LCDR Ronn Maratea. Pg. 28 Photos: PH2 Charles Norden. Pg. 37 Photo Art Schoeni, courtesy LTV.

CAPT John Lavra, USNR (Ret)

The Last Bouquet



I've flown 'em all from now to then,
The big ones and the small,
I've looped and zoomed and dove and spun,
And climbed 'em to a stall.

I've flown 'em into wind and storm,
Through thunderhead and rain,
And thrilled the folks who watched me roll,
My wheels along their train.

I've chased the steers across the range,
The geese from off the bay,
I've flown between the Princeton towers,
When Harvard came to play.

I've clipped the wires from public poles,
The blossoms from the trees,
And scared my best friends half to death,
With stunts far worse than these.

The rules and codes and zones they form,
Are not for such as I,
Who like the great wild eagles flung,
My challenge to the sky.

A bold free spirit charging fierce,
Far out above the rest,
And don't you like these nice white flowers,
Laid out on my chest?

FOD CAUSES BAD TRIPS

Idea contributed by VT-9.